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Meeting of The Field Agts.
Crop Specialists & Admin.
Officials. Bu. of Crop Est.
Jan. 22-27, 1917.
Washington, D. C.

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MEETING OF THE FIELD AGENTS, CROP SPECIALISTS AND ADMINISTRATIVE
OFFICIALS OF THE BUREAU OF CROP ESTIMATES AT THE NATIONAL
MUSEUM, WASHINGTON, D. C., JANUARY 22-27, 1917.

Opening Address
by
Leon M. Estabrook,
Statistician and Chief of Bureau.

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Gentlemen:

It affords me great pleasure to welcome you to our second general meeting of Field Agents and Administrative Officials of the Bureau. The first meeting of this kind was held in January, 1914. At that meeting were present the former District Special Agents who were in charge of groups of States, a few newly appointed Field Agents, and the present Administrative Officials of the Bureau. As I look over this assembly I see about thirty new faces that were not present at the former meeting. Of those who were present at the first meeting, Mr. Shaw, of Georgia and Florida, resigned in 1914; Mr. Bradford, of Arkansas and Louisiana, and Mr. McCorkle, of Tennessee, failed to pass the required Civil Service examination and their appointments were terminated in 1914; Mr. Hitt, of Idaho, died suddenly on December 27 last; and Mr. Richardson, Kansas, has resigned to enter the newspaper business. Mr. Kelsey, who was Chief Clerk at the last meeting, passed the Civil Service examination for Field Agent and was transferred to New York; Mr. Blair, who was Chief of the Clerical Section of the Division of Crop Reports, was assigned to field work as Truck Crop Specialist. Mr. Kelsey was succeeded as Chief Clerk by Dr. Fansler, who resigned last year to practice dentistry. Mr. Blair was succeeded by Mr. Crane as Chief of the Clerical Section of the Division of Crop Reports. Dr. Fansler was succeeded as Chief Clerk by Mr. Cramer, formerly Fiscal Agent of the Forest Service.

Those of you who were present at the former meeting and others who have read the annual reports, Circular 17, and the hearings before the House Committee on Agriculture will recall that prior to July, 1914, the Bureau was known for many years as the Bureau of Statistics, that its field organization consisted of about 17 Special Agents, each in charge of a group of States, and that in each State was a State Statistical Agent, who was a political appointee, who received a small annual salary, and who devoted only a portion of his time to the work. In the summer of 1913 a committee was appointed by the present Secretary to study the organization and methods of the Bureau and to make recommendations which in their judgment would improve the service. This committee submitted an exhaustive report in the autumn of 1913 and recommended among other things that the field force should be strengthened, (1) by abolishing the position of State Statistical Agent, which was outside of the Civil Service and very unsatisfactory; (2) by abolishing the system of District Special Agents, whose territory was entirely too large; (3) by appointing a competent Field Agent at an adequate salary in each State or group of small States, the position to be in the classified Civil Service and appointments to be made only after passing a rigid Civil Service examination; (4) by the appointment of additional Crop Specialists who would specialize on particular crops; and (5) to extend the crop reporting service to a greater number of special crops and to report in greater detail on the staple crops.

The report of the Reorganization Committee was approved by the Secretary and the necessary legislative authority was embodied in the appropriation act for the fiscal year 1915. In July, 1914, the title of the Bureau was changed to the Bureau of Crop Estimates, in order to indicate to the public more clearly the real nature of its work. Civil Service examinations were held in all the States, and from the list of eligibles thus secured new Field Agents were appointed in many of the States. The former District Special Agents were already in the classified service and they were assigned to States within their former districts. On June 30, 1914, the appointments of all the State Statistical Agents were terminated.

In accordance with the policy outlined by the Reorganization Committee a Truck Crop Specialist was appointed in 1915, Mr. Blair being selected for this position because of his experience as a truck grower and his ability as an organizer. During the present month two Assistant Truck Crop Specialists have been appointed, Mr. Risser of California, and Mr. Marks of Michigan. There was also appointed a Fruit Crop Specialist, Mr. Folger of Washington. During the present month also a Field Agent was appointed for New Mexico, Mr. R. F. Hare of that State, which will permit Mr. Harrison to concentrate his attention on the one State of Arizona. Mr. Kaufman of Fresno, California, has been appointed Assistant Field Agent for that State, and Mr. Johnston of California was appointed as Assistant Field Agent for Texas.

In the three years which have elapsed since our first meeting the number of Field Agents and Crop Specialists has increased from about 21 to 52, or 150 per cent; the annual appropriations have increased from \$243,680 to \$333,790, or approximately 27 per cent; the average salary for Field Agents has increased from \$1,693 to \$1,842 per annum, or an average increase of about 9 per cent.

With respect to estimating a larger number of special crops and in greater detail for staple crops, I am sure that all the Agents who were in the service three years ago are fully aware of the gradual change that has taken place in this direction and the greatly increased burden that has been laid upon them. So much for a review of the changes in organization and work that have been effected during recent years.

With respect to present policies and future plans I can only repeat what was said at our former meeting. The old districts comprising several States were abolished and Field Agents appointed for each State, except where several small States are combined as the equivalent of a single State. The object of this concentration of territory was to make it possible for a single Agent to become personally familiar with every part of the State. The newly appointed Agents were required to pass a very severe Civil Service examination to test their educational qualifications, and only those who had practical experience in agriculture and were legal residents of the States to which they were to be assigned were permitted to take the examination. It was and is the desire of the Bureau to appoint as Field Agents and Crop Specialists only men who have had

practical experience in farming, men of mature years, men well educated in the fundamental principles of agriculture and statistics, men of the highest character and ability who would command the respect and be able to secure the cooperation of all State and local officials and prominent farmers in their States. We hope that by obtaining thoroughly competent men, trained in agricultural and statistical methods, who can themselves inspect and judge crop conditions, in the course of time we could expect them to obtain more accurate data and in greater detail than has ever been available. We would also expect that as these well qualified Agents become familiar with crop conditions and with the people of their States, and as they gradually accumulated data for every part of their States, they would come to be recognized as the leading authorities on agricultural production in their States. This has been our theory in the past and it is our hope for the future. I believe that our hope was well founded and is rapidly being realized. Decided improvement has been noted in the monthly reports and comments of the Field Agents, and Dr. Jones, who has occasion to inspect periodically and critically the records and field work of the Agents has reported most enthusiastically on the improvement that has taken place. He has reported that the Field Agents no longer hesitate when questions are put to them regarding their territory; they know with some degree of certainty many things now that formerly were not known or merely surmised. As time goes on the Crop Reporting Board feels that it can place more and more reliance upon the estimates of the Field Agents, and that the time will come when other sources of information will have less weight in determining the action of the Board. I assure you, gentlemen, that this change and this improvement is very gratifying to the Bureau. It gives us confidence in the results which we publish and for which the Bureau is held responsible. In time, as the facts become better known, I am sure it will tend to inspire confidence in the public mind and add tremendously to the value of the crop reports.

Just as we expect the Field Agents to become the recognized authorities on crop production in their respective States, so we expect the Crop Specialists to become recognized as leading authorities on the production of their special crops. As the result of its system the Bureau has attained an enviable position with respect to the accuracy of its estimates of the cotton crop. The Bureau was severely criticized for its estimate of the 1915 rice crop, but a thorough analysis of the data on file in the Bureau and in the possession of the Rice Crop Specialist convinced us of the substantial accuracy of the estimate, which was more than confirmed by the canvass of all the rice mills in 1916, which indicated that our estimates were well within one per cent of the actual facts. The tobacco estimates of the Bureau are also generally accepted by the trade as being extremely accurate.

m The Truck Crop Specialist in the two years he has been at work has obtained commendable results. He was seriously handicapped by lack of assistance in an entirely new and complicated field. With the 200 per cent increase in his force this year and a possible further increase next year we have every reason to believe that more valuable results will be obtained.

In addition to the truck crops it is planned to estimate the various fruit crops. The business of growing fruit is highly specialized and the general system of estimating the great staple crops does not seem to work so satisfactorily with the special crops. As previously stated, a new Fruit Crop Specialist has been appointed. He has had many years experience in connection with apples, especially in the investigation of cost and methods of production. I think it will be well for him to confine his attention, at least during the first year, to organizing his work and devising better methods for estimating the apple crop. Next year, or the year following, the system which has been developed for estimating apples can be extended to peaches, and in future years, with increase in force which we hope to obtain, estimates will be made for cherries, pears, grapes, citrus fruits, small fruits and nuts.

Another plan we have in view is to urge upon Congress the desirability of appointing an Assistant Field Agent in each State. A beginning was made this year in the appointment of an assistant in California and Texas. Unfortunately, it is impracticable for a Field Agent to be physically present in more than one place at the same time. It is difficult for any Field Agent to travel over his State every month; it is difficult for him to keep up his necessary record work and correspondence during the limited time he has at his headquarters; and it is almost impossible for him during many months of the year to give thought or study to the data he has accumulated or to plan and carry out desirable projects on an adequate basis. An assistant could relieve him of much work of a routine character and of some travel, besides being available to carry on the work without interruption in case the Field Agent is incapacitated by sickness, is absent on account of business, or leaves the service for any reason. The present system is weak in not providing an understudy for each Field Agent.

The next plan we have in mind is to urge upon Congress the desirability of furnishing each Field Agent with a clerk to attend to routine correspondence, look after the mail during the absence of the Field Agent, and to assist him in the preparation of his monthly report. This item was included in my estimates for the next fiscal year but was eliminated in the Secretary's Office. I shall renew the request annually until we succeed in getting the desired increase. The argument for clerical assistance to the Field Agents is that the principal value of a Field Agent to the service is his expert judgment of crops and his ability to collect original data, so that his time is of too much value to the Department to be absorbed in clerical work which, although absolutely necessary, can be performed as well or better by a clerk. Until we succeed in securing the necessary appropriation to provide for permanent appointments of clerks in the field the Agents will be permitted to employ temporary clerical assistance to the extent that funds will permit.

A third means of improvement that appeals to us very strongly is the furnishing of government-owned automobiles to the Field Agents in most of the States. The necessity and desirability of such facilities for transportation is obvious to most of you and will be discussed in our program. For some reason not readily apparent there is a very strong prejudice in the minds of Congressmen and some accounting officials of the Treasury Department against the use of automobiles by government employees.

I included in my last estimates an item authorizing the purchase and operation of about 30 automobiles. This was stricken out in the Secretary's Office on the ground that the present session of Congress is not an opportune time to ask for this authority, and it was feared that if the question were brought up before the Agricultural Committee it might result in added restrictions on the privileges already enjoyed by some other bureaus of the Department. I was disappointed but not discouraged and will renew the recommendation annually until the question is considered on its merits.

As to the future work and development of the Bureau, I feel that there has never been a time in the history of the Department when its crop estimates have been subjected to so little criticism or have been so generally accepted as accurate. Our aim should be to effect a closer approximation to accuracy as the years go by, because the real value of the estimates depends mainly on their accuracy. Of especial importance is the question of estimating acreage and numbers of live stock and I can not too strongly urge upon you the necessity for devoting a large share of your time and attention to these two subjects. I have often regretted that the changes in the organization of the field force and in methods should have occurred midway between census years. However, a compensating thought is that our better organization and service may result in a closer approximation to the totals of the next census, and that following the census the Bureau can avoid serious deviation from the facts with respect to acreage, production and numbers of live stock. The Field Agents with their work well organized in each State and with the experience and data accumulated in the years preceding the census will be in an excellent position to cooperate effectively with the census officials in organizing the work of the next census. I have no doubt the Census Bureau will welcome the cooperation of this Bureau in drafting the agricultural schedules and in planning their work for the next farm census.

The results obtained and made available by the Office of Markets with respect to the commercial volume of crops, particularly special crops, should be of material assistance to us in future. Our ideal should be to make our final estimates come within at least three per cent of the facts.

In conclusion I wish to express the hope that the meetings this week will be as interesting and beneficial to all of us as were the meetings of three years ago; and that at the close of the meetings we will be filled with a spirit of cooperation, personal friendship, enthusiasm and optimism. While the meetings are called primarily for our mutual instruction, because all of us can learn something from them, the administrative officials as much as the individual field men, another principal object is to foster the feeling of solidarity, the feeling that each of us belongs to a compact, efficient, growing organization with a future before it and a highly important function to perform in the work of the Department and in the economic development of the nation.

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The Assistant Secretary, Mr. Vrooman, had expected to be with us today and deliver the opening address, but I have just received notice that he had to appear before a committee at the Capitol, which will prevent his being present today.

The first subject on the program under the heading of "Bureau Organization and Methods of Work" is a subdivision on personnel, equipment, etc., by the Chief Clerk, Mr. Cramer.

Accounts, Supplies, Equipment, Etc.,
By H. B. Cramer, Chief Clerk.

Mr. Estabrook has assigned me the duty of speaking to you about accounts and office procedure. We have had in the past year about 600 Field Agents' expense accounts to handle. After being given an administrative audit in our office they are submitted to the Disbursing Office for settlement, and then to the Auditor for the State and Other Departments, Treasury Department, for final audit. Of these 600 accounts suspensions were made only in 14, amounting in all to \$15.60. This does not include three vouchers for the expenses of a personally-owned automobile, which were incorrectly stated upon a mileage basis, and which, upon resubmission to the Auditor in proper form, were promptly passed for payment. In looking over the suspensions made in the accounts of the Department for the past year I find that the following will give you an idea as to some of the criticisms and exceptions made, and if not clearly understood I will be glad to explain them more fully:

Suspensions by the Auditor

An employee purchased a ticket from Washington to Richmond, Va., \$3.50, and the same day purchased a return ticket from Richmond to Washington, at a cost of \$3.50. There is an excursion rate from Washington to Richmond of \$5.00 round trip. The Auditor suspended \$2.00. Had this employee stated upon his account that when he purchased his ticket he did not know where he would go from Richmond the suspension would not have been made. However, when excursion rates are obtainable they should be taken advantage of, as required by paragraph 78 (a) of the Fiscal Regulations. Recently the Solicitor rendered an opinion in a case where an employee of his office appealed from the decision of the Auditor in disallowing the difference between a straight one way fare and a round trip as follows:

"It was your duty to purchase a round trip ticket where possible. If, subsequently to your arrival at destination, you had been ordered to return by another route, the return portion of the ticket could have been presented to the Railroad Company for redemption. Under the circumstances the purchase of a round trip ticket was practicable and the excess cost incurred is disallowed."

An employee included in his expense account a charge for "labor cleaning clothes" 25¢. The Auditor disallowed the item, stating that it is a personal expense and not reimbursable.

An employee purchased a lower berth for a journey, leaving at 7.30 a. m. and arriving at destination at 10.15 p. m. As seats in the Pullman were sold between the points traveled the Auditor disallowed the difference between the seat and berth rate.

An employee left Washington on Saturday afternoon for ----- in order to spend Sunday at ----- and charged \$1.20 for supper enroute on Saturday. The Auditor says this employee should have left Washington at 4.10 a. m. on Monday and arrived at destination at the same time he did arrive, and that the supper was not chargeable to the Government.

An employee submits a number of subvouchers, the body of which was written in ink but the signature in pencil, with the statement that ink was not available. This indicates that the subvouchers were filled in subsequent to the actual signing, which is contrary to the law and regulations, and new vouchers were required.

The payment of rent for post-office box prior to the end of the quarter is contrary to law.

An employee charged for per diem from lodging, Sunday, August 22, to supper, Tuesday, August 25, three days. He was on sick leave previous to Sunday, August 22. It was necessary for him to show that he performed service on Sunday, the 22nd.

An employee enroute from Washington to a point in the field arrived at St. Louis at 5.50 p. m. and left at 11.30 p. m. He was in a per diem status and charged for transfer from station to hotel and return in order to get his supper. The Auditor disallowed the item, stating that he should have obtained his supper at the terminal station and the transfer was unnecessary.

An employee sent a telegram to the ticket agent of a railroad company to reserve sleeping car accommodations. The Auditor disallowed the item, stating that it was not provided for in the regulations.

An employee arrived at his official station at 7.34 a. m. and the Auditor disallowed 70¢, the cost of breakfast, stating that he should have obtained this meal at his official station without cost to the Government.

Various items are disallowed for sleeping and parlor car charges on account of no seat checks being furnished. This is absolutely necessary. If check is lost the employee will be put to the trouble of applying to the Pullman Company in Chicago to obtain a duplicate, which can be done provided he gives the date, number of train, and points between which travel was performed.

Whenever baggage is checked at the station the number of pieces checked must be stated.

Telegrams requesting leave will not be allowed.

An employee hires an automobile for a journey from a person of the same name. The Auditor suspends the item for information as to relationship of the parties.

Prior to the passage of the appropriation act for 1917 it was not permissible to rent an automobile for a definite period, but this restriction has been removed and you may now rent an automobile by the trip, day, week or month, but it is imperative that you should state upon the subvoucher the terms of the agreement, either verbal or written, that you make with the owner for its use. It is preferable that the rate agreed upon will include the gasoline used.

Another point, on many occasions you gentlemen are invited to accompany a friend or State Agent over your territory in his personally-owned automobile, for which no charge is made, except perhaps his subsistence enroute. If you furnish his subsistence it will be proper to submit the charge in your account, also a statement of the facts, being sure to state that such arrangement was previously made. The Comptroller has decided that the expenses of a personally-owned automobile can not be computed on a mileage basis, but that the actual amount of gasoline, oil, and carbide used, with a statement of how the measurements were arrived at, together with the expense of having the car washed or stored over night away from the employee's official station, are permissible if the employee prepares the expense account on the blanks provided for that purpose. This blank shows the points traveled between, the material used, and at what points obtained and the number of miles traveled.

An employee arrived at his official station at 12.45 a. m., or shortly after midnight and charged per diem for lodging, having incurred no expense for lodging or sleeping car accommodations. The allowance for one-fourth day per diem was not allowed.

In the States Arkansas, Tennessee, South Carolina, Mississippi, and Iowa tips are illegal and a great number of disallowances have been made on account of being prohibited by the State laws.

An employee left Washington at 1.42 p. m., Sunday, and charged for dinner enroute. He stated that he was unable to obtain this meal before leaving Washington on account of it being Sunday. The Auditor says that a mere matter of household convenience does not warrant postponement of the meal at the Government's expense beyond the ordinary and reasonable time, and disallowed the item.

An employee applied to the ticket agent of a railroad company in Washington for a through sleeping car ticket from Washington to Little Rock, Arkansas, and was refused. He was compelled to purchase a ticket to transfer point and one from the transfer point to destination; the cost of the two tickets was \$1.00 in excess of the through rate. The Auditor states the error or improper action on the part of the Agent imposes upon the Government no greater obligation than would exist if, for instance, the Agent had demanded an excessive amount for the transportation ticket. The adjustment lies between the employee and the Pullman Company.

I think it would be a good plan if you gentlemen would make your requisitions for supplies at stated periods, say quarterly. I believe you can anticipate your wants that far ahead, especially for printed envelopes.

On July 1 we make an allotment of funds for expenses that is deemed requisite to run you through the year. April 1, after the rendition of your March account, we request you to state the probable amount that you think will be necessary to run you through to the end of the fiscal year, in order to equalize the allotments; some may show a deficit and some a surplus. In that way we may know if we will have funds to purchase additional equipment. I wish to specially call attention to these requests and to ask that you give them your prompt attention and to make as conservative an estimate as you can as to your possible needs without hampering your work in the least.

Crop Records and Library.
by
Frank Andrews.

The work of the Division of Crop Records is to make use of published statistics relating to agriculture. We have to do with both United States and foreign crop figures. The sources of the statistics are the official records of this Bureau and reports issued by both government and private authorities.

The crop reports of foreign countries have a practical interest to the people of this country; many a time the question is asked "How much wheat did Canada harvest this year?" or "What is the size of the Argentine corn crop?"

The crop estimates of various State officers and of private agencies are of interest in the Bureau. We should know what is being done in our line of work, by others beside ourselves.

The production of a given crop is considered frequently in connection with market prices and exports.

In order to get reliable information on such subjects two things are necessary; first, a sufficient amount of material containing the information, and secondly, a sufficient number of trained investigators to get the facts out of the mass of printed and unpublished material.

The library of the Bureau of Crop Estimates consists of probably over 10,000 books and several hundred files of periodicals.

The bound volumes consist of the crop estimates and other agricultural statistics from practically every country which makes such reports; also, the official publications of those countries as to exports and imports. These publications are in the languages of the countries which publish them. However, in the case of Japan, an English edition of the annual report of the Minister of Agriculture is published, and for Russia and some other countries the reports are partly in French as well as in the native language.

In addition to the foreign statistics we have practically a complete file of the reports of the Department of Agriculture, the Census Bureau, and various other federal offices whose statistics relate to our work. The State reports, giving not only estimates of production and acreage of crops and live stock returns, as issued by State Agricultural officials, but also reports of the financial officers of the State, as assessors, treasurers, auditors, etc., on the same topics, are also on file. The Field Agents are familiar with the reports of their respective States and have supplied the library with many volumes.

Besides the government publications we have practically a complete set of statistical reports of the various boards of trade and similar commercial organizations of the United States. Some of these reports, as for Chicago, Cincinnati, St. Louis and New York, cover periods of from 50 to 70 years. One of the most frequent inquiries is for prices covering a series of years. At the outbreak of the present European war a number of inquiries were received as to what changes had taken place in prices at the beginning and at the end of various wars within the past 60 or 70 years. Hence, we find our old material sometimes of real present worth, and the tendency is for the older volumes of our files to gain rather than lose their value to us.

The periodicals, received in the library every business morning, keep us in touch with what is going on in agriculture, and in the buying and selling of agricultural products. These periodicals include about 50 daily, 150 weekly, 160 monthly, and from 125 to 150 other publications. About one-half of these periodicals are published in the United States and one-half are foreign.

In addition to the library our material includes a growing collection of manuscript records. One of the most extensive of these manuscript records is that prepared by Mr. Daugherty, which shows for each country practically all the available agricultural statistics, from the earliest to the most recent date.

The Division of Crop Records has charge of estimates of sugar crops. These estimates, except for maple sugar, are practically enumerations based upon reports from individual factories, and include the cane sugar crops of Louisiana and Hawaii, and the beet sugar production of the entire United States. Many of the beet sugar reports and all of the Louisiana figures are now collected by Field Agents.

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January 22, 1917.

INTERNATIONAL INSTITUTE OF AGRICULTURE

By

Perry Elliott.

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The Institute was established under the International Treaty of June 7, 1905, which was ratified by 40 governments, and subsequently has been ratified by 15 more, making a total of 55 governments now adhering to the Institute.

The Institute is a government institution in which each country is represented by a delegate of its choice. Its object is to collect, study, and publish as promptly as possible, statistical, technical or economic information, concerning agriculture, relative to production, trade, prices of vegetables and animal products in the various countries, and wages paid for farm work; to make known the new diseases of vegetables which may appear in any part of the world, showing the territories infected, the progress of the disease, and, if possible, the remedies which are effective in combating them; and to collect and publish information which might be useful in the various countries in the organization of works connected with agricultural cooperation, insurance, and credit.

The official language of the Institute is French, but some of the publications are also issued in English, German, Italian, and Spanish. The Institute has also adopted the metric system of weights and measures, and the French monetary system for values.

The expense of collecting these data as well as other expenses of the Institute are paid from a fund appropriated by the adhering countries. The total revenue for 1914 from all sources was estimated at \$226,357, of which \$164,050 was due from the adhering countries, \$57,900 from the King of Italy, and \$4,407 from sale of publications and interest on the reserve fund.

The nations adhering to the Institute are classed in five groups and vote according to the number of assessments contributed by each. The nations in group I have sixteen assessments and five votes, group II eight assessments and four votes, group III four assessments and three votes, group IV two assessments and two votes, group V one assessment and one vote. The unit of assessment is 2,500 francs, equivalent to \$482.50. The United States is in group I and annually contributes \$7,720.

The control of the Institute is vested in a General Assembly, which meets every two years and is composed of the representatives of the adhering governments. The honor of representing the United States was conferred upon Mr. George K. Holmes in 1909, and upon Mr. Victor H. Olmsted in 1911, and upon Dr. A. C. True in 1913. The executive power of the Institute is intrusted to a Permanent Committee, composed of the permanent delegates who reside in Rome and who meet once a month.

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The working force of the Institute is divided into four Offices or Bureaus, General Secretary's Office, Bureau of General Statistics, Bureau of Agricultural Intelligence and Plant Diseases, and Bureau of Economic and Social Intelligence.

The crops on which data are collected are wheat, rye, barley, oats, flax fiber and seed, hemp, rape, sesame, corn, rice, cotton lint, cotton seed, sugar beets, potatoes, tobacco, hops, vines, olives, sugar cane, and coffee. These data relate to area sown and harvested, production, yield per unit of area, conditions under which crops are planted, monthly condition of crops during the growing season, and crop damage by various causes.

Cablegrams are received from the Institute showing conditions, area, and production of crops in different countries. When sufficient data have been collected these cablegrams show the approximate world area and production of crops. Usually the unit of area in these cablegrams is the acre and the unit of weight is the English hundred-weight. When these cablegrams are received the data are converted to United States units, and fifteen copies made, two for the Bureau files, and thirteen for the Office of Information to be transmitted to as many newspaper associations.

If a cablegram is received in the forenoon it is usually sent to the press in time for the evening papers; or if received in the afternoon it is sent out in time for the morning papers the following day. Under normal conditions this information is being read by the American public in less than 48 hours after it leaves Rome, but under present conditions more time is required to transmit cablegrams.

The products of agriculture on which reports of foreign trade of the United States are reported are wheat, wheat flour, rye, barley, oats, corn, rice uncleaned, rice cleaned, cotton, and flaxseed. The data in this schedule represent the trade for the current month and the portion of the current year ending with that month, with figures for the same periods of the preceding year for comparison.

These data gathered by the Institute for both crops and trade statistics are published monthly in a Bulletin of Agricultural and Commercial Statistics. From the Institute's list of 32 publications, the one just mentioned and the Year Book of International Statistics are probably the most useful to this Bureau.

January 22, 1917.

FOREIGN CROPS AND CROP REPORTING ORGANIZATIONS

By
G. F. Frick.
oOo

With the exception of Turkey, every nation of Europe is now publishing annual estimates of the yields of agricultural crops, and no matter what the method or system used in a particular country, it naturally divides itself into two branches concerned respectively with (1) definite records of areas and yields of the principal crops compiled in a scientific and systematic manner, and (2) statements of the condition of the principal crops during growth with careful estimates of areas and forecasts of yields made either before, during or after harvest. Under the first of these branches the statistics collected may for convenience be called absolute, representing as they do the finally revised verdict of the officials responsible for them, while those under the second, though prepared by the same officers and possibly by the same machinery, may be called approximate, and although serving a useful immediate purpose as approximate indications, they are necessarily tentative and temporary, and are ultimately replaced by permanent records obtained by statistical methods of greater accuracy.

In all countries that have established any sort of system for recording the progress of growing crops and of estimating areas and yields, dependence has to be placed largely upon the services of correspondents, who, if not practical farmers, must at any rate be well acquainted with the local agricultural situation.

Despite the great amount of attention that statisticians have given to the difficulties attendant upon the comparison of international crop statistics, the obstacles are still various and numerous, principally because of the lack of uniformity in the systems and the different methods used in expressing the results. For instance, this difficulty is illustrated by the fact that in Argentina for the purpose of expressing condition the terms "very good", "good", "regular", and "bad" are used; in Sweden an excellent condition is expressed by the numeral 5, with variations from that standard in a descending scale; in Germany an excellent condition is expressed by 1, good by 2, fair by 3, and so on; in England an average condition is expressed by 100 with variations above or below according to circumstances; while in other countries the conditions are expressed in descriptive terms as excellent, good, fair, poor, etc.

In the comparisons of international yields the difficulties met with arise not so much from the final official estimates as from the methods in obtaining them. In Austria there is a practice which seeks to obtain an estimate for a large district by applying thereto the average figures obtained from typical small areas. The practice in making these computations is to send skilled experts, who select three small typical areas. Each expert chooses in a large district three small areas typical of a small, a medium and a large scale of cultivation. From the average figures obtained from these areas are

calculated the average percentage which each crop bears to the total area of the district. For manifest reasons, this method no matter how carefully the averages may be calculated cannot be regarded as statistically satisfactory. In Argentina after the completion of the harvest a final estimate is made of the yields of the principal crops, this being accomplished with a near approach to accuracy through information collected from the owners of threshing machines. All such machines are registered in the Division of Statistics, and the railway companies advise the Division periodically as to the destination of new machines. While this method reflects the effects of losses from almost all causes it necessarily does not take into consideration the grain left in the stack to be threshed the coming season.

In Sweden the preliminary estimates of the yield of cereals are based on the natural increase of the seed, without reference to acreage. They estimate the yields of cereal crops in multiples of grains, called "korntal"; that is, according to the number of grains produced by each seed, but without reference to the seed sown. The difficulty here is that the result is the gross yield, including the grain sown as seed and the net yield or grain produced from the seed.

The above are only a few instances of the many pitfalls for the unwary in his attempts to make international comparisons. The fact that many European countries deal in metric measures, the United Kingdom and British Colonies in English measures, and other countries in other measures, is extremely inconvenient. An example of this is illustrated by the following fact. The production of oats in Germany in 1912 is given in the German official publication as about 8,520,000 metric tons. In the "Annual Returns of Agricultural Statistics" published by the Board of Agriculture and Fisheries, of Great Britain, this quantity is given in the English equivalent as about 60,187,000 quarters, that is about 481,496,000 imperial bushels. The Year Book of this Department gives the same production in the United States equivalent as about 586,987,000 Winchester bushels. Now the English imperial bushel is approximately a little over 3 per cent greater than the Winchester bushel. But the United States statement of Germany's oats production is about 18 per cent greater than the English statement. The explanation of the discrepancy is simply that the German production of oats is expressed by weight (metric tons) which is converted by the English Board of Agriculture at the rate of 39 or 40 lbs. per bushel, and by our own Department at the rate of 32 lbs. per bushel. One may safely say that if the Germans expressed their own oats' production in bushels they would most probably accept neither 32 pounds nor 39 pounds as the equivalent of a bushel.

This is a pure case of non-identity of definition as to what is a bushel of oats. The illustration is a striking instance of what must be repeated indefinitely throughout the range of international agricultural statistics and gives rise to the question of what sort of comparison one would be justified in making between the recorded production of one country and that of another, assuming the statistics cover the whole, or the same proportion, of the production in each country. It seems at least clear that all publications containing statistics of agriculture

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in different countries should contain the most complete definitions possible of the measures of production used in the several countries, and a statement of their relations one to another.

January 22, 1917.

SPECIAL INVESTIGATIONS.

By
George K. Holmes.
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This Bureau was established in consequence of a strong request made upon Congress by farmers to provide a national governmental agency to ascertain the prospective production of crops from time to time throughout the growing season and to estimate at the end of that season what the production had been. This was in 1863, but it was no sudden or instantaneous proposition. For years farmers throughout the country had been complaining of their weakness in the market in the sale of their products because of their want of information concerning the imminent supply and also concerning the more remote supply. The farmers were many, were widely scattered, and were mostly unorganized, but, on the other hand, the middlemen who bought from them were comparatively few and made it a part of their business to get some information, more or less imperfect though it was, concerning the amount of what the farmers had, and would have, to sell. So the two parties--the farmers and the middlemen--were unequally equipped with knowledge to determine what the true relation between demand and supply should be, and in this position of inequality no doubt the farmers suffered and received less for their products than they should have received.

This weakness of farmers in the market had, for a long time, been under discussion, until, about half a dozen years before the Civil War, the State Agricultural Society of Maryland, with some financial help from the State, if I remember correctly, established a crude system of reports concerning the condition of the principal crops from time to time during the growing season and a plan for determining the amount of production, but this plan was much more crude than that concerning crop conditions. Dependence was placed on voluntary correspondents scattered throughout the State. They were unable to provide the information concerning production in accordance with the simple plan adopted and their reports concerning condition were not definite enough to be understood in terms of quantity or even of relative quantity. The Maryland attempt at crop reporting was a failure almost as soon as begun.

In the meantime a notable man of his day in national agricultural history, Orange Judd, the owner and editor of the American Agriculturist, had undertaken to devise a system of crop reporting to be operated from his office of publication. He had become acquainted with a system of crop reporting, for some years in use in Prussia. In that system the condition of crops was expressed by numbers in percentages of a precisely defined standard production. This was something definite, provided that the standard could be uniformly understood; and it was of such an arithmetical nature that the percentages of condition could be related to production, if production were known for a series of years long enough to permit the conversion of condition for the same period of years into bushels and other terms of product. Such a crop-reporting plan, before it had been tried out and tested, seems to be hardly better than a freak of transcendentalism on account of the purely mental character of the standard crop, but, nevertheless, the reports of condition were arithmetically expressed and this was a useful feature that commended itself.

Orange Judd organized a corps of correspondents and worked at his system of crop reporting for several years with enough success to indicate that, with modifications, it might be worth adopting for use during an indefinite future. It was this system with modifications, that was chosen by this Bureau and which is still in use after having adopted many improvements. The transcendental standard crop, which this Bureau called a normal crop with a technical definition, although still nothing more than a fiction of the imagination, has, after all, permitted dependable results, when based on the reports of a large number of correspondents, so as to average out of influence the plus and minus errors of correspondents in their misunderstanding of what a normal production is. Indeed, it is extremely interesting to know that better results are obtained in basing reports of condition on the normal crop than could be obtained by using reports of condition in terms of prospective production per acre, expressed in bushels or other units. This has been determined by a special investigation that Mr. Murray conducted a year or two ago.

The crop-reporting system of the Bureau had hardly grown into working order when J. R. Dodge became the chief of the bureau, or of the division as it was called in those days. His mind was so constituted that he acquired a very good understanding of the system and was able to improve it gradually. More pertinent to my subject, however, is the fact that Mr. Dodge had an active and intellectual mind and worked extensively in the field of special reports and investigations outside of technical crop reporting. He early began the investigation of the wages of farm labor with such success that from time to time he continued it for many years. Many of his special investigations, however, were dependent on materials derived from other collectors of information rather than from information collected from the correspondents of this Bureau. He was afraid to use his correspondents very much outside of the regular crop-reporting service, because, during his tenure of office, correspondents were regarded as being too conscious of the gratuitous character of their service. At any rate, it was a part of the spirit of Mr. Dodge's administration that correspondents should be handled with little demand upon their services outside of the monthly crop reporting for fear of damaging that service.

For this reason many of Mr. Dodge's special articles were concerned with the foreign trade of the United States in agricultural products, with the movement of agricultural products to the principal markets, and with special products, such as wool, beet sugar, wheat, cotton, and so on. A considerable amount of information was assembled with regard to such principal products from time to time and the published matter received wide and respectful attention. Among other subjects specially treated by Mr. Dodge were the effect of climate on crops, the service of silos, the production and utility of fertilizers, the supply of ashes, the drainage of farm lands, the income derived by farmers from their agriculture, changes in cultivated areas, prices, and freight rates on farm products. Many articles were published by him concerning agriculture in foreign countries--countries in Europe, Asia, South America, and, indeed, in all parts of the world. Now and then he selected a special State of this country for consideration as, for instance, Florida, or a section, one of which I have observed was the so-called Northwest, that is, northwest of Chicago.

In 1893, a new chief came into the Bureau, the trend of whose mind was very different from that of Mr. Dodge's. He had economic, social, and monetary theories that were uppermost in his mind. He made the mistake of using his opportunity to exploit certain of his theories. One of the evidences of this is an early circular of this Bureau published in 1896 concerning the "Farmer's Interest in Finance". You have heard probably that there was some talk in those days concerning the unlimited coinage of silver at the ratio of 16 to 1 of gold. This little circular was issued to incite farmers to a greater interest in behalf of the unlimited coinage of silver, although at the same time the Secretary of the Department was known as a "gold man". It is safe to say that no Secretary since that time would have permitted the publication of anything concerning this subject, whether pro-silver or anti-silver. It is remembered that Secretary Morton, who had been drawn into a discussion of this subject from time to time by the chief of this Bureau, took advantage of the opportunity presented by a pay day and handed to the chief a bag of silver dollars for the entire amount of his pay. This bag of silver had considerable weight and the chief took it up to the bank at noon to exchange it for a draft on some other city, but one bank after another declined to take the coin for that purpose.

Another subject that was a prominent one in the Bureau from 1893 to 1897 was the single tax, and the chief of the Bureau published a pamphlet to advance the cause of the exclusive taxation of land. This was issued early in 1897. I was in the Bureau at that time, and, although I had nothing to do with the plan of the investigation, yet I was sent to New York to confer with Thomas G. Shearman, the noted lawyer and also a noted single taxer. The object of the conference was to obtain Mr. Shearman's advice concerning the practical means of ascertaining certain essential information concerning the taxation of farms in certain townships in selected counties in the State of New York. This pamphlet was issued in the middle of February, 1897, and it was suppressed by the Department on the afternoon of the following 4th of March, when the administration changed.

Down to 1897 only 12 bulletins had been issued in the series now recognized as being the formal one of this Bureau. The first one was a report on the culture of certain fiber plants in Europe, and the second one was concerned with agriculture in South America. The third bulletin was a large one devoted to the cooperative credit associations in European countries, prepared by E. T. Peters. This was a bulletin of permanent value and was a scholarly production. Within two years or so it has been reprinted by Congress.

The results of nine investigations of the wages of farm labor beginning with 1866 filled Bulletin 4, issued in 1892, and this was followed the next year by a bulletin devoted to the production and distribution of the principal agricultural products of the world. Rice is the subject of the sixth bulletin, its cultivation, production, and distribution in the United States and foreign countries; and this was followed by an agricultural survey of Wyoming and a brief bulletin on the foreign trade of this country in agricultural products. The ninth number was devoted to the production and price of cotton for 100 years. It is a small bulletin, but it contains a large amount of concisely expressed information concerning this subject, prepared by James L. Watkins, who had made a special study of cotton history for many years and who is now conducting a private cotton-reporting service in New York.

As the years elapsed, the bulletins improved in subjects and in their treatment, that is, generally speaking, for there could hardly be an improvement upon the cooperative credit bulletin, nor upon the one that was devoted to 100 years of cotton. The bulletins all expressed the results of special investigations and, up to the time when the issue of bulletins on a bureau serial numbering ceased, in 1913, their last number reached 103. Since that time several bulletins containing the results of special investigations have been issued from this Bureau in the Departmental series in which all bureaus appear.

Among the subjects treated in the later period were the course of prices of agricultural implements and machinery, wheat production in Argentina, cereal production and trade in Europe, the international sugar situation, methods and routes of exporting farm products, the international meat trade, changes in farm values and the local conditions affecting them. There are also bulletins concerning hops in principal countries, the meat supply and surplus of the United States, ocean freight rates, the dates of seedtime and harvest, the marketing of grain and live stock on the Pacific Coast. Other bulletins treat of cold storage, the inland boat service, the efforts of railroads to promote agriculture, the agricultural foreign trade of the United States, the production and consumption of dairy products, and there is a comprehensive treatment of the supply and wages of farm labor.

The Bureau has a list of 47 circulars ending with 1913. The earlier ones are devoted to a small variety of subjects, among which cotton is the most prominent, but, after 1901, the subject of foreign crops was almost exclusively the one included in circular publication.

The Monthly Crop Report has provided a small amount of space for the results of many special investigations expressed in highly condensed form, but often containing matter of much importance. Among such special investigations has been the causes of crop damage by climate, insects, and so on, with the various causes expressed as percentages of the entire damage. Other special investigations compressed within the narrow opportunities for publication afforded by the Monthly Crop Report are a collection of reports on large crop yields throughout the country; the per capita consumption of wheat; the quantity and value of fire wood consumed on farms; the costs of producing various crops and farm animals; the area of the potential arable land of this country; and the determination of the relative monthly sales of certain products from farms. This last-named subject is one of large practical importance and its utility in the handling of price statistics is at once apparent. Already these relative monthly marketings have been used in computing the average farm price of cotton and cottonseed by means of weighting the monthly prices by the relative monthly sales.

The Bureau's special investigations have taken another form of publication and a prominent one in the Department's Yearbook. Almost every year since 1896 this Bureau has been represented among the special articles contained in the Yearbook. Many of these have received extensive notice throughout the country, for the reason that they were filled with information of a popular, instructive, and readable sort. Among the Yearbook articles have been those concerned with oil seeds, the future demand for American cotton, practices in crop rotation, the nation's farm surplus, consumers' fancies, freight costs and methods of transporting meat animals, and methods and costs of marketing. Still other subjects are the reduction of waste in marketing, agricultural production and prices, the progress of agriculture in the United States, and the movement from city and town to farms.

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The special investigation may look like a little thing, but sometimes special investigations are of large proportions and in any event they are best performed by those who have knowledge of the art and the technique of statistics as applied to these special topics. In the first place, the subject should be a sensible and proper one--something germane to the work of the Bureau and at the same time a subject of popular interest or one that will attract favorable attention. Such a subject as this occupied a bulletin of ten years ago and related to the costs of hauling crops from farms to shipping points. The author, Mr. Andrews, first established his factors of distance of haul, of weight of load, of quantity to be hauled, and of cost of each trip, and then it was a simple matter of arithmetic to arrive at large and important results. The formula adopted in this special investigation is good for to-day and for the future, and is still in use.

Within a few years, the scope of the work of this Bureau in fields that may be covered has been restricted, so that its endeavors are mainly confined to the broad subjects of production and consumption, with whatever subtopics that may be related to them. These subtopics, however, are very numerous, and, indeed, the primary topics that may be treated within the broad fields of production and consumption are much more numerous than one would suppose before becoming familiar with them. It is safe to say from observation that at no time previous to the time when the scope of this Bureau's work was restricted, nearly four years ago, was the Bureau so pressed for time and labor to perform the special investigations that were actually on hand and were also knocking at the door.

It is not only the subject of the special investigations that should be sound, but it is of much importance that the investigator himself should have a similar character. He should be sound in intellectual honesty; he should know the logical values of facts and of factors; he should not be ill-balanced intellectually; he should have no dominating isms and ologies, but, on the other hand, he should have stored up in his mind a large amount of information covering a great number of subjects and, above all, he should have a considerable degree of natural arithmetical insight. I am speaking now of investigations of a statistical sort, such as those that are made in this Bureau.

How a special investigation can fail when in the hands of a man of much real ability was illustrated within my observation years ago. It was an attempt to determine the per capita consumption of wheat, and the investigation was made by a man possessing a mind with a most remarkable analytical power; consequently he could not refrain from constructing a plan of investigation that was too elaborately analytical. This necessitated establishing a great number of factors, all of which had to be sensible, that is, within the bounds of reason and good sense, and consistent with one another. The materials of information were assembled and worked out to results, and then these results were compared. Numerous conspicuous inconsistencies at once appeared. Endeavor was made to cure these by arbitrarily changing some of the elements that were put through a course of tabulation for arriving at the per capita consumption of different classes and descriptions of people. Now, an arbitrary change in basic material is something that no investigator should ever make. In the first place, it is not intellectually honest and, furthermore, what is the sense of constructing a fabric of conclusions out of suppositions and arbitrarily established materials?

The best form of special investigation treated according to the statistical method is one dependant upon a few factors. Simplicity is a matter of great advantage to the successful execution of a plan. The advantage is not only in accuracy of the main results, but there is corresponding economy in time and labor required for the work. In a Bureau such as ours, where there is pressure all of the time upon the available labor for special investigations, every temptation to add a detail that is not essential should be fought.

Having arrived at the statistical determination of the results of a special investigation, it is usually advisable, and even necessary, to prepare text to explain the sources and processes employed and the principal significance of the results. This should be no opportunity to exploit one's pet theories nor to announce a great economic "law", and if you could see this word law in writing you would see it in quotation marks. I have seen many of these mistakes made by experienced investigators and writers, as well as by students fresh from the class room in college, where they have been informed that such and such a conclusion has been established for many years and is an economic law which is too holy to be questioned.

The editors of this Department could give you a long story of their work at suppressing writings that are of the sort that I have mentioned. Indeed the manuscripts of whole bulletins have been tossed overboard for this reason. It is not always, however, the new writer who is the guilty one. I call to mind a certain university professor in this country whose name is perhaps as well known as the name of any other one among all of the eminent university men that we have and whose writings are considerably known in other countries, who, at his own solicitation, years ago secured a contract with the Department to perform a certain special investigation of an economic nature. One would have supposed that he would have performed this work with brilliant results, and yet his mental processes, his habits of years of university work, and the predominance of certain isms in his mind and work combined to produce for this Department a manuscript containing the results of his investigation which it was very unwise to publish. Nor was it published.

Fundamental to everything else in statistical work, and this includes work on our special investigations, is the determination of a fact. We plan to find certain facts, but how can we discover them? How can they be discovered in their entirety and in their true character, so as to be represented numerically in conformity with the requisite description? We carry on a conversation with a friend upon a topic, or perhaps upon a running variety of topics, and we are free to express ourselves in statements of fact, and of opinions based on facts; and yet if our statements were placed in print and appeared in dreadful cold type before the public, how many of our so-called facts would survive? Not all of them, certainly; that is, just as we stated them. The special investigator should be a doubting Thomas from beginning to end; he should not have doubt enough to give himself a case of paralysis, but he should not possess overconfidence and he should continually scrutinize every representation of fact that comes to his hopper.

January 22, 1917.

BUREAU TABULATING AND REPORTING, AND
MAINTENANCE OF LISTS OF REPORTERS.

By
Edward Crane.
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The Division of Crop Reports as at present organized consists of 60 clerks, composed mostly of expert tabulators and computers. A section of 16 clerks known as the Township Section, in addition to tabulating township reports, has charge of the township, county, special price, and field agents lists, one clerk having under his jurisdiction from two to five states, depending upon the size of the state.

The tabulations in connection with the Crop Report, are begun on the last day of the month preceding the month in which the Report is issued, and extend to the fifth of the next month, on which date the tabulations are closed, averages struck, and the material turned in for consideration at the hands of the Board. Our county reports are weighted, but owing to the large number of schedules involved, it has not been found practicable to weight the township reports; in fact, it has been found that very little difference results from weighting and not weighting township reports.

We employ the shingling method of tabulating our township returns; that is, ten schedules for the same district are placed upon the desk, one above the other, and the sum of the answers to each of the inquiries placed on the tabulation sheet opposite the figure indicating the number of reports, which enables us to strike a straight average.

Our county reports are tabulated individually, and each item weighted.

To safeguard the estimates for the large producing sections from becoming known before the issuance of the report, the following method is employed:

The most important states of production are designated as "cut-off" states. That is, the first 100 township reports received and the first twenty county reports are tabulated on a sheet known as the "cut-off" sheet. This sheet is then put aside until the closing day, and the tabulation is resumed on another sheet. On the fifth of the month, the closing day, the partial totals of the regular sheets are carried forward to the head of the "cut-off" sheet. The entire tabulation for each state is then turned in, and the "cut-off" sheet is cut with shears, separating the top of the sheet which bears the name of the state from the tabulation. Both parts of the sheet are given a corresponding number in order that they may be assembled by the Board; the last half of the "cut-off" sheet with nothing to indicate to what state it pertains, is given out for final addition and the computation of averages.

To give you an idea as to the growth of the Division of Crop Reports, I will state that in the year 1905, fifty-one different schedules containing 485 inquiries were sent out, as against 274 schedules aggregating 8,446 inquiries in 1916. This, of course, means additional labor in preparing schedules, folding, filling, sealing, sending them out, and when returned to the Bureau, increased work in opening, assorting, tabulating and computing.

All stenciled lists of reporters, including field agents' lists, are cut and maintained in the Division of Publications of the Department, which is located in another building. This creates a rather round-about procedure in making additions and subtractions in connection with the various lists of reporters. A Field Agent is asked to submit Add Forms in duplicate and Drop Forms in triplicate, one copy of each being retained in our office to enable us to determine what is outstanding. One Add Form and 2 Drop Forms are submitted to the Division of Publications. The return of a stencil proof card to a Field Agent indicates that the name has been properly added, and the return of one of the proof cards stamped "Removed from List", indicates that the name has been dropped. The mailing lists from which the various publications are sent are maintained in the Government Printing Office, but all matters pertaining thereto must pass through the Division of Publications, of the Department.

All names placed on stencil are automatically listed for the Monthly Crop Report. A special request, however, must be made for the Weekly News Letter.

The practice of submitting names of cross-state reporters, that is, a person reporting for an area located in one state, but whose post-office is in an adjoining state, is to be discouraged. As stencils are filed by states in the Division of Publications, it would prove very confusing to their filing arrangement. Such persons should not be added to the stencil, but where their services are required, they should be addressed personally by the Field Agent. The Post-Office Department requires that the name of a county and the post-office address agree.

I desire to urge upon the Field Agents the necessity of submitting both an Add and a Drop Form to cover any change in the name or address of a reporter. A simple statement to change so and so to so and so, is not sufficient. Under the present system it involves two distinct operations on the part of the Division of Publications which maintains our stencil lists, the adding process being carried out by one man and the dropping by another.

At this time, in addition to the County, Township, and Field Aid Lists utilized monthly in connection with the regular Crop Report, we have 18 special lists of reporters which are used for special inquiries.

January 22.

PREPARATION OF BUREAU ESTIMATES.

By
Nat. C. Murray,
Assistant Chief of Bureau.

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A brief description of the Bureau's methods of preparing its estimates, its regular and some of its special sources of information, etc., are given in Circular 17, entitled "Government Crop Estimates, Their Value, Scope, and Preparation". Every Field Agent ought to be familiar with the contents of this little booklet; I shall at least assume that you are, and that it will not be necessary for me to restate its contents now, but will confine my remarks to some phases of the preparation of the estimates which are not given in Circular 17, or which might be of particular interest to the Agents.

A marked distinction is made in the method of handling and estimating the so-called "speculative crops", corn, wheat, oats, and cotton - that is, the Special A crops - on the one hand, and all other crops - or Special B crops - on the other hand.

As soon as a Special B report is received, it is opened, or, if wired, is deciphered immediately, and the figures placed on a "pink slip". Duplicates of these pink slips are mailed each month to all Agents, for their respective States, therefore they are familiar to you all. Also as fast as the county, township, and special reports have been averaged State by State, they are turned over to the Statistician to be put on the pink slip. This work usually begins on the 5th of the month and extends to the 6th and sometimes to the 7th, and is done directly by Mrs. Thompson, with assistance during the rush period. As soon as the mailed B reports are received the figures are taken off by Mrs. Thompson and the notes or comments are turned over to the Statistician for a preliminary reading. The two days previous to the issuance of a crop report is a busy time in the Statistician's office, especially in the latter part; therefore it is a convenience to have the Agents' B reports as early as possible. Not so with the A reports. No matter how early they are received, they are not opened before the morning of the report; but it is important that they be received before the opening of business on report day.

The Crop Reporting Board considers the "A" crops, crop by crop; but the Statistician considers the "B" crops, State by State. That is, the Board considers corn State by State until it completes corn, then takes up wheat, then oats. Therefore it is desirable that the corn notes be on separate sheets from the wheat notes. Such separation is not so necessary, however, in the case of the B reports, as all such crops for a State (with few exceptions) are considered at one time. It is desired, however, that the crop comments come in the same order as the crops on the schedule.

Referring again to the B reports - as soon as all the figures from the various sources (as County, township, and Agents) have been entered upon a "pink slip" for any State, or rather, as soon as several are "ready", they are given to the Statistician, to determine the Bureau's official estimate. When making this estimate, the Statistician has before him "the pink slip", also the pink slip of the previous month or year, the county tabulation sheets, county agents' notes, weather reports, Agents' notes, and sometimes State reports. (The county sheets give the straight as well as the weighted averages of the weighted crops. Reference to them with the individual reporters' averages and the county weights often explains variation in the figures on the pink slip.)

The Agent's comments from some of the States are very important, being illuminating and helpful, whereas comments from Agents of some other States are too brief or featureless to be of any assistance.

As to the value of Field Agents' reports versus other data, or, considering the subject more broadly and asking the question what is the relative value of the different classes of reports - as Field Agents, county reports, township reports, and special reports - the answer would depend upon many things; as, who the Agent is, how large the State is, or how many counties in the State, what the crop is, or what the subject matter - as, acreage, condition, yield per acre, or quality. There is almost no limit to the possible combination of factors before the Statistician or the Crop Reporting Board. But a few guiding policies may be given.

As a general statement, subject to qualifications, it may be accepted that, taking every thing into consideration, the reports of Field Agents are now the most important of the several classes of reports received by the Bureau, and they are becoming more and more important relatively. County reports are relatively least important in small States where the number of counties is too few to furnish an adequate number of estimates; they are also of least importance for crops that are not weighted but concentrated within a part of the State. They are of much value, however, in States having a considerable number of counties, and for crops widely grown, especially for weighted crops, for which we have both a weighted and an unweighted average. We do not copy the unweighted averages of the county reports on the pink slips mailed each month to the Agents. The township averages have more value, relatively to county reports, in small States and for unweighted and concentrated crops. The reasons for these differences in valuation between county and township reports, according to number of counties and concentration of crops, will be readily perceived by you, I have no doubt. In Delaware, for example, there are only three counties. One or perhaps two county reporters may fail to report, or one of the reporters may have a radical figure, so that there is not a sufficient number of reports to give stability to the estimate. Ten, twenty, or thirty reports of township reporters will give a more stable and satisfactory average. Also, in a large State, if a crop is grown only in one or two counties, the county figure is consequently based upon but one or two reports, whereas the township may have twenty or more. It may be observed here that although township reports are at present unweighted, there is a self-weighting tendency in them, the reports on any particular crop being most numerous in sections of largest production. The question of the number of reports necessary to make a satisfactory or stable average will be considered when the subject of averages is discussed.

Most of the investigations made by the Bureau relate to acreage, to condition, or to yield per acre. Of these, the question of condition expressed by percentage gives the least difficulty to the Bureau but is most puzzling to new Agents and to persons who have not had personal experience in collecting such information. You have probably observed from the "pink slips" sent to you monthly that there is, as a rule, nearer agreement between the county, township, and Field Agents' figures relating to percentage condition of crops than in figures relating to yield per acre or acreage. The Statistician has to depend less upon field men for condition estimates than for other matters of investigation, as acreage, or yield per acre, particularly as regards crops of general or widespread cultivation in a State, as corn, hay, oats, cotton, etc.

The reason for the doubt or questioning as to the percentage condition figures is the apparent vagueness of the basis, or the so-called normal. If there is no agreement or common understanding among reporters as to what is a normal, of what value is their average? The answer is that the value is in the comparison of such average with the average of the reports made by the same reporters at previous dates. A more detailed answer may be given at another time during the program of the week.

Now when the Statistician is considering what to make the official estimate of the condition of a crop in any State, he examines the averages from the different sources, namely, Field, county, township, and sometimes Special. If there is a close range between them, as 67, 68, 68, he is likely to accept without much further examination the majority figure, as 68. If the range be wide, as 75, 66, 65, an examination of the reports of the preceding month is made; if two classes show a decline and one a rise, there is a presumption that the one indicating a rise is faulty, although this does not necessarily follow. Next an examination is made of the changes in adjacent States; if they also show a decline, the presumption that the figure indicating an improvement is faulty is strengthened. The comments are reread to learn if they might give a reason for such difference. The weather reports are read to learn what influence weather conditions have had. Comparisons are also made with the figures of some other crops which might have approximately the same condition as the crop under consideration. And thus, by an accumulation of evidence, the Statistician, or Board, sitting as a jury as it were, decides upon a final estimate. By such method, a figure of one of the three or more classes of reports is sometimes disregarded entirely. Sometimes when there is a little doubt as to the probable figure, "the benefit of the doubt" is given in the direction of the radical figure.

When agents' comments or weather reports indicate that conditions on or about the first of the month have an improving tendency, the benefit of doubt is thrown to a higher figure. On the other hand, if conditions are declining, the benefit of the doubt is given to the lower figure.

The subject of bias is an important one in crop reporting, but it does not cause much difficulty in condition reports. This is because condition figures are of comparative value only, and the bias in the one set or average is neutralized by a similar bias in the set or average used in comparison. For example, suppose the county correspondents regularly underestimate the condition

10 per cent; that their average condition figure on a given date is 60 and that the average of their estimate in 10 years on like date is 80. The true condition would be about 66 and 88 respectively. But 60 bears the same ratio to 80 as does 66 to 88. That is, both the biased figures and the corrected figures indicate the condition to be 75 per cent of the 10-year average condition. Therefore the Statistician in determining the Bureau's condition figures is not disposed to follow the Field Agents in an undue effort to counteract the supposed bias of crop reporters.

In determining the Bureau's condition estimates, the Statistician and the Crop Reporting Board must always keep in mind that condition figures are index figures, to be used as a basis of forecasting yields; that there should be a uniform ratio between the condition figure and the yield per acre indicated. For example, if a condition of 80 per cent of normal is assumed to indicate a yield of 24 bushels of corn, a condition of 90 should indicate 27 bushels, and a condition of 100 should indicate 30 bushels. Or, reversing the situation, if we assume that a normal, or 100 per cent, condition forecasts a yield of 30 bushels, a condition indicating a yield of 24 bushels should be reported as 80 per cent. Studies of past records of harvest-time condition figures and yield per acre figures show a close harmony. (See diagram in Statistician's Report for 1910.) There is one exception to be noted. When the indications are for an exceptionally high yield, the average of the condition reports does not fully reflect the high promise. This is because some reporters seem to think that a condition can not be reported higher than 100. Therefore when conditions are so good that the county and township reports average 100 or more, the Statistician or Board is inclined to take the high figure. One Agent noticed on the September pink slip sent him that the Board reported the condition of oats 102, when he had reported 100, the county average was 103, and the township 98. He mildly criticized the Board's figure as too high. Comments indicated unusually high yields. The condition of 102 forecast a yield of 43 bushels. In the next month, October, the Bureau estimated the yield as 48 bushels, the Agent having reported 49 bushels. To forecast a yield of 49 bushels in the September report, it would have been necessary for the Agent to report the condition nearly 120.

A decidedly different policy influences the Statistician and Board in estimating the acreage of crops and numbers of live stock. Here, bias, instead of being neutralized, is cumulative in effect, and must be overcome. This is the most difficult task of the Bureau of Crop Estimates and the one in which the labor of Field Agents is needed most. If the work of the Bureau was limited to making percentages of normal crop condition figures, the employment of the field force, with its cost, might not be justified by results.

The Bureau is depending more and more upon Field Agents for its acreage estimates, and less and less upon the other classes of reports. All agents have not yet learned, or been able, fully to overcome the tendency to underestimate. As an illustration of the disastrous effect of underestimating the numbers yearly (the same would be true for acreage), I will quote the figures furnished by a certain Field Agent for hogs. His yearly estimates of numbers in percentage of the preceding year were, 1911 = 90, 1912 = 53, 1913 = 75, 1914 = 80, 1915 = 97. From these figures, the cumulative estimate in 1915 is 28.5 per cent of the number in 1910. The assessors returns in this State gave in 1915 a number equivalent to 103 per cent of the number given by the assessors in 1910.

Other examples could be cited. Such estimates are a drag, rather than a help, to the Bureau. I am glad to be able to state that nearly all Agents now evince a thorough understanding of this situation and that the Bureau can accept with confidence their reports.

If bias were uniform, it would be a simple matter to determine its extent and make an arbitrary allowance. But such is not the case. For example, if the acreage of corn in 1915 should happen to be very short - say 60 per cent of 1914, which was a normal year - and the true acreage in 1916 be the same as in 1914, the percentage in 1916 would have to be $166\frac{2}{3}$ of 1915 to show this; but the bias in such a case would probably be 25 per cent or more, whereas when the acreage does not change much from year to year the bias is likely to be only about 5 per cent. Therefore in determining the Bureau's acreage estimates the Statistician and the Board must take into consideration acreage changes in previous seasons. Agents should do likewise in making their estimates for the Bureau.

In determining the yield per acre the Bureau is depending more and more upon the Field Agents' reports. Bias in yield estimates is not cumulative, and is therefore less harmful than bias in acreage estimates. Like condition estimates, bias is neutralized in comparative use of the figures, which is the predominant use. However, yield figures differ from condition figures in being concrete, quantitative data, and it is desirable to eliminate if possible, or reduce to a minimum, any tendency toward bias in yield per acre reports. There is probably a slight biased underestimate in the yield per acre estimates of county and township reports. And here it might be well to refer to a frequently repeated statement that farmers overestimate their yield per acre. Yield per acre reports may be made in two ways, namely, from the farmer's report of yield on his own farm and from the farmer's estimate of yield per acre in his neighborhood. The comment about overestimating applies only to the first, namely, reports for his own farm. But this is not the way the Bureau gets its averages; it gets them from the second-mentioned method, namely, from estimates for a community. Until a few years ago, the Bureau regularly each year received reports of yield per acre of individual farms - called individual farm reports. The averages from these returns were invariably far higher than the averages obtained in the usual way. An examination of our returns of yield per acre in the census year with the census reports shows that the correspondents' reports for their communities did not differ widely from the average yields per acre shown by the Census, but that the averages of the individual farm reports far exceeded the Census averages. In view of excessive averages of the individual farm reports as compared with total averages as indicated by the Census, the Bureau has ceased collecting yearly individual farm yield reports.

Referring again to acreage estimating, it might be stated in closing that in making the final estimates last December the Bureau attacked the problem in several different ways. Assessors figures were consulted wherever available. Comparisons with the reports of "usual" acreage were made. Individual farm reports of actual acreage in 1916 and 1915 were consulted. The relation between the acreage of one crop and the acreage of others was calculated. An inquiry was made among reporters as to the proportion of total crop area devoted to different crops. No single method of ascertaining acreage is without some defect. This composite method of estimating acreage is far from being perfected.

The Field Agent, with his intimate knowledge of his State, is better able to analyze the various data and account for or harmonize differences than is the Statistician at Washington. Therefore it is contemplated that during the present year the Statistician will confer with each Agent individually, and go over with him the various data and the method of coming to a final acreage estimate.

RELATION OF FIELD AGENTS TO SPECIAL CROPS

By

January 23, 1917. Leon M. Estabrook

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Gentlemen: In my remarks yesterday I mentioned the fact that the function of the Field Agent is primarily to specialize upon the crop production of a single State, and the function of the Crop Specialist is to specialize upon his particular crop throughout the regions of its growth. In all work it is sometimes difficult for the workers themselves to keep in mind a clear and proper perspective, with every part of the field in its logical place, and shown in due proportion and relation to the composite whole. As individuals our own work is nearest and looms up before us sometimes to the exclusion of the work of others. In the work of an individual also some parts will appeal to him more strongly than others, and if left entirely to follow his own inclinations he will devote more time and energy to certain phases of his work in which he feels a personal interest than to other phases which may be of equal or greater importance. Furthermore, an individual is sometimes tempted to give precedence to a part of his work through considerations of convenience, of opportunity, of outside pressure, or to follow the line of least resistance. It is, therefore, important that we consider for a moment the relative importance of different phases of the Bureau's work, which will indicate the order in which its field investigations should have precedence.

The net result of the work of the Bureau is the periodical crop estimates, so that it may be said that the whole object of having a Bureau of Crop Estimates is to supply the public with periodical crop estimates. The value of the crop estimates we publish depends (1) upon their accuracy, (2) upon their timeliness, and (3) upon the particular crops to which they relate. The first two factors mentioned, accuracy and timeliness, relate to all reports. They are of fundamental importance and must be striven for by everyone concerned in the collection of data and the preparation and publication of the reports. They are matters concerning which every employee of the Bureau is expected to cooperate with every other employee so far as practicable.

It seems to me, however, that the real criterion which determines the relative importance of all the different phases of the Bureau's work is to be found in the third factor, which determines the value of crop estimates to the public, namely, the particular crops to which they relate. The relatively small group of great staple crops, which are grown over wide areas and in many States as principal crops, easily outrank all others, which, because they are grown less extensively, or only in certain localities, or for which the market demand is limited, are called special crops. In money value the staple crops rank about as they are shown in the Monthly Crop Report for December of each year; that is, the group of cereals, comprising corn, wheat, oats, barley, rye, buckwheat, flaxseed, rice and the kafirs, valued at more than four and one-third billions in 1916, rank first; second in rank is cotton and cotton-seed, valued at more than one billion; third in rank is hay, valued at more than a billion; fourth in rank are potatoes, both kinds, valued at one-half a billion; fifth are apples, valued at one hundred and eighty-six millions; sixth, tobacco, valued at nearly one hundred and seventy millions. Then come

various crops, only one of which, citrus fruits, aggregate in value more than fifty millions annually. If we take the aggregate value of all live-stock on farms, which was more than six billions in January, 1917, live-stock would rank first. When we consider the tremendous importance of these great staple crops, and live-stock, not only to farmers but to the entire population, it is clear that they should have our best efforts and should take precedence over all other crops. For that reason I think the Field Agents should devote the principal portion of their time and attention to the great staple crops of their States, especially to the question of acreages and numbers of live-stock. These two main lines of inquiry, acreages of staple crops and numbers of live-stock, should take precedence in their work over all other investigations; and, conversely, no other investigation should be permitted to interfere with their work on the staple crops, especially acreages and live-stock. I think this is the key to the whole situation and will serve as a rule which will enable an agent to decide how much time he can afford to devote to crops of lesser importance.

Why does the Bureau have Crop Specialists? Mainly to supplement the work of the Field Agents. On one or two occasions, when I appeared before the House Committee on Agriculture, I was asked the question, "Why does the Bureau ask for Crop Specialists for minor crops; why not have specialists for such crops as wheat, corn, oats and live-stock, any one of which is worth more to the country than all the minor crops combined?" The answer is that where a crop is grown extensively throughout a State or a region comprising many States, where the industry is well and widely established, and where sources of information are abundant, it is comparatively easy to estimate the crop; but where a crop is grown only in limited areas or is widely scattered, or is not well established, as in the case of fruit and truck crops in some States, it is extremely difficult to estimate them because our organization and methods were designed primarily to estimate the great staple crops.

When a Crop Specialist undertakes to collect data with regard to his specialty, he is at once confronted with the difficulty of adequately covering the wide range of territory in which his special crop is grown. Knowing that in each State there is a Field Agent of the Bureau who travels throughout the State many times each year, that the Field Agent is in close touch with all the local sources of information, and that the Field Agent is engaged in the regular course of his work in accumulating a body of accurate data with respect to all crops grown within the State, the Crop Specialist naturally turns to the Field Agent as his best and most available source of information, especially at the beginning of his campaign. The first impulse of the Crop Specialist, therefore, is to begin sending his special schedules of inquiry to the Field Agent. The Field Agent is immediately confronted with the difficulty of supplying a mass of detailed information about a minor crop which it is difficult to estimate and to which he may have given little or no attention in the past. Under these circumstances what is the policy of the Bureau and what shall be the rule to govern the Field Agent? (1) The Field Agent is expected to collect data on all crops grown in his State, to record his data systematically so as to be readily available, and to list all the principal sources of information. In other words, he is expected to qualify as the leading authority on crop production in his State. He is also expected to give precedence to the staple crops grown in the State and to specialize on acreage and numbers

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of live-stock.

(2) The Crop Specialists are expected to devote their entire time, attention and energies to collecting data on the particular crops assigned to them, utilizing for this purpose all available sources of information, including the Field Agents.

(3) The Field Agents and Crop Specialists are expected to cooperate whenever practicable without interfering with each other's work. The Field Agents will make available to the Crop Specialists such data relative to special crops in their States as they may already have or can readily obtain. The Crop Specialists will make available to the Field Agents the results of their special investigations in a State. The work of both classes of agents is Bureau work and each class should facilitate the work of the other so far as practicable.

(4) The rule which may be laid down for the guidance of Field Agents and Crop Specialists is that the staple crops and live-stock in each State must have precedence over special or minor crops and that inquiries relating to special or minor crops must not be allowed to interfere with the investigation of more important crops. With this rule in mind Field Agents should be able to decide readily whether or not they can supply particular information to the Crop Specialists without interfering with their more important work on staple crops. If they can supply such information without such interference it should be done; otherwise they will be justified in ignoring such special inquiries and the Crop Specialist will have to rely upon other sources of information.



TRUCK CROPS

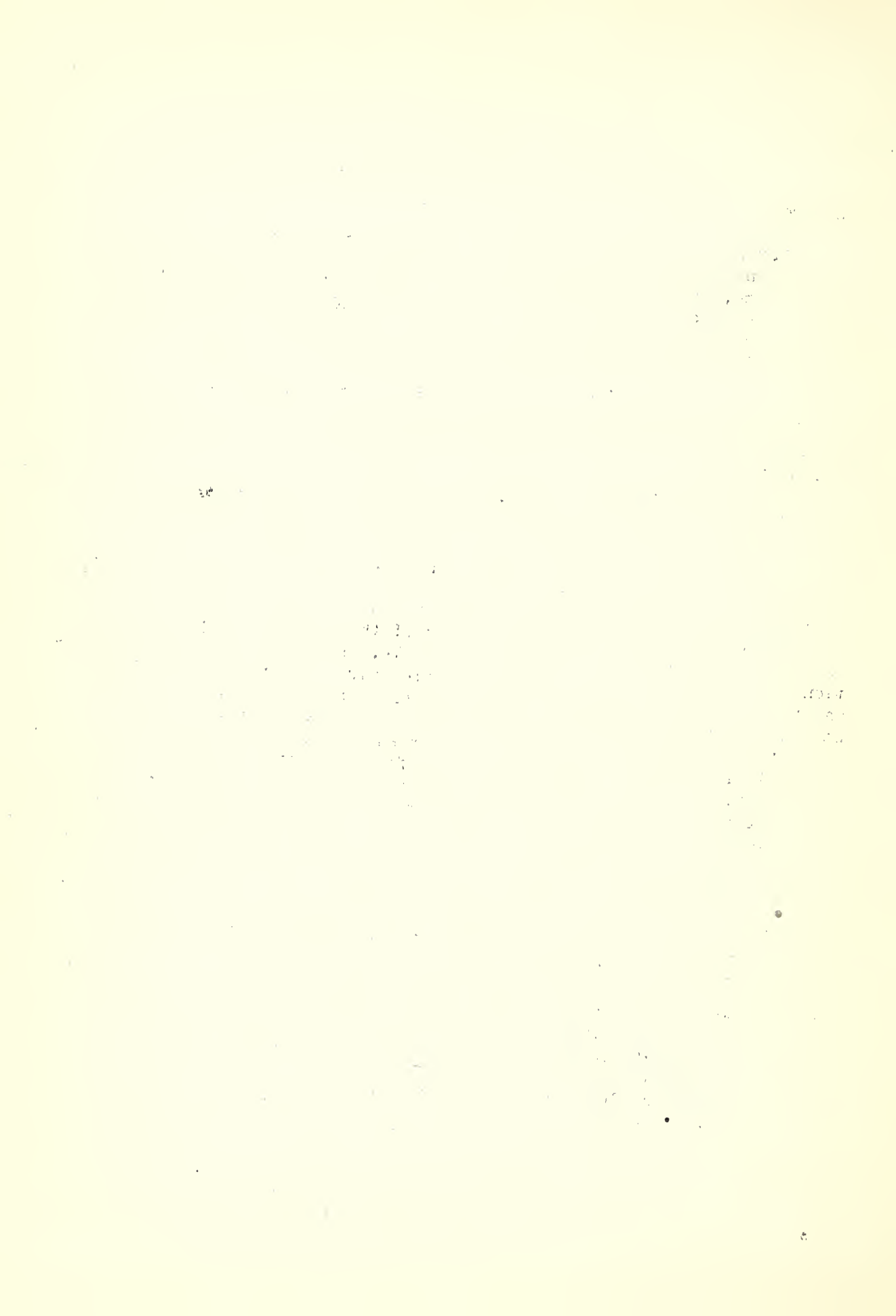
January 23.

By F. J. Blair.

Gentlemen:

You have all some acquaintance with the truck crop project, as it has been necessary to bother you with requests for information from time to time, and I am glad to be able to say that I think that the field agents have done what they could to help me build up this part of the service. In addition to such help as you have been able to render, I have to thank Mr. Estabrook for the unqualified support of the Bureau.

Most of you know that this work was taken up in 1914. I don't think that I accomplished much that fiscal year outside of acquiring sort of an education by visiting all of the principal trucking sections of the country. I found that rattling around in the United States was some job. As most of you think you are pretty well provided for in your several States, I think you will agree that the United States is some territory to tackle single handed. That was the beginning. I did not have much of any plans, there was the water and I just jumped in and began splashing. There was no list, and that was the first thing I tried to get. The only available basis for comparison was the enumeration of 1910, and inquiries were made as to the increase or decrease in the acreage of the several crops as compared with that year. The acreage and production of the northern crops of cabbages and onions were estimated for 1913 and 1914, and in the light of information since gathered, those estimates were fairly accurate. The trouble was that the Census included market garden areas and was for the whole State, and the commercial crop, which was the production sought, had to be estimated in States in the form of a percentage of the total crop produced. The rapid fluctuation in truck acreages for such crops as lettuce, tomatoes, watermelons, cantaloupes, etc., made such a basis very doubtful. It, therefore, became necessary to secure another basis and to discard the percentage system entirely, resorting to the direct method of obtaining acreage figures. The shipping point was selected as the unit and the results obtained have been very satisfactory. It has been found possible to secure reporters from practically all shipping points as well as reporters who have knowledge of much larger areas, including several shipping points, or all of the shipping points in one or more counties. The reporters of the latter checking up the reports from the units or restricted areas. I now have a general list containing about 8,000 names, and special lists for all of the more important truck crops. The condition schedules go to the general list; acreage and nearly related inquiries are made from special lists. We have the names of about 2,500 canners on our list, which is supplemented by about 2,000 names of growers of canners products. I have a force of one assistant and six clerks in the office and two field assistants now engaged on the work, and expect to be able to add two more field assistants during the coming year. I don't think any one realized the size of the job at the start. I know that I did not, but I have come to believe that I could keep the whole Washington force busy without much trouble. Up to date we have not been able to half realize our ideals. Before you can proceed with confidence you must create a past, secure records to act as a check against



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your futures. Having secured our acreages by shipping points, we now have, as 1917 opens out, from two to three years behind us, and begin to feel that we are reaching solid ground. This year we shall expand. We shall estimate the production of more crops, and contemplate the establishment of a semi-monthly news service to consist of letters returned from the principal centers of truck production. This service will eventually become a weekly service, and perhaps, eventually a weekly night letter service, and so be up to the minute almost for timeliness. The Bureau is now in receipt of a letter from a member of the N. Y. State Growers Association asking for cooperation. This is a market garden proposition largely and will open up that phase of the subject. Altogether the end is not in sight, and, I can see that considerable further expansion will be necessary before we are able to supply all of the information that will be sought.

January 23, 1917.

TOBACCO.

By
J. P. Killebrew.
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Tobacco, as reported by this bureau, is divided into two general types: cigar types and chewing, smoking, snuff and export types. Cigar tobacco is grown in six districts; New England, New York, Pennsylvania, Ohio-Miami Valley, Wisconsin, and Georgia and Florida districts. The chewing, smoking, snuff and export types are grown in eleven districts: Burley, Paducah, Henderson or Stemming, One-Sucker, Clarksville and Hopkinsville, Virginia Sun-Cured, Virginia Dark, Old Bright Belt, New Bright Belt, Maryland and Eastern Ohio Export, and Louisiana-Perique districts. Previous to 1908 no report of production and value by districts was made. In the final report that year production and price per pound by districts was estimated but no acreage given. Beginning in 1909, acreage, yield per acre, production, price per pound, and value have been reported both by states and districts.

In New York, Pennsylvania, and Wisconsin the district and state are coextensive. The Georgia and Florida district is the tobacco growing area of those states. The New England district is the tobacco growing area of New Hampshire, Vermont, Massachusetts, and Connecticut. The Ohio-Miami Valley district is in Ohio. The Burley district lies in four states: Kentucky, Ohio, West Virginia and Indiana. Some Burley is also grown in Tennessee where the area is increasing and in future should be considered in estimating this type. The Paducah district is in Kentucky and Tennessee. The Henderson or Stemming district is in Kentucky and Southern Indiana. The One-Sucker district is in Kentucky and Tennessee. The Clarksville and Hopkinsville district is in Kentucky and Tennessee. The Virginia Sun-Cured and the Virginia Dark districts are in Virginia. The Old Bright Belt is in Virginia and North Carolina. The New Bright Belt is in North Carolina and South Carolina, with small areas developing in Georgia and Florida, which have not been considered in estimating this type. Most of the product has been sold on the loose floor markets of North Carolina and South Carolina and was absorbed by the crops of those states. The Maryland and Eastern Ohio Export district is in Maryland, Eastern Ohio and West Virginia. The Louisiana-Perique district is in Louisiana.

In estimating the crop it is best to work by types and when the areas of type districts are known the areas by states can be estimated by allotting to each state the proper per cent of each district in it. For instance the area of Burley according to the last census was 265,000 acres divided as follows:- Kentucky 211,000 acres, Ohio 28,000 acres, Indiana 11,000 acres, and West Virginia 15,000 acres. The per cent in each at the present time will vary but little from the

census. This method is more accurate than to estimate by the state as a whole and use the census figures as weights. In the state of Virginia the acreage of dark tobacco has decreased while the bright has increased since the last census was taken, and to use the census figures as weights for the state as a whole would give incorrect results in estimating either yield per acre or price, as the dark yields more pounds per acre and sells for a lower price than the bright. It would be all right to use the census figures for estimating each district, then use the production or acreage of the current year as weights in estimating price or production for the state. In estimating the yield per acre for Kentucky last year I used the following figures:

District.	Acres.	Yield per acre.	Pounds.
Burley	198,600	1005	198,790,000
Paducah	72,700	785	57,070,000
Henderson	102,300	910	93,093,000
One-Sucker	33,000	875	28,875,000
Clarksville & H.	71,700	850	60,945,000
All other	5,700		4,460,000
Total	<u>484,000</u>	<u>920</u>	<u>443,233,000</u>

The production divided by the acreage gives the yield for the state. This same method should be used in estimating the price per pound for the state. Add the value of the crop in each district then divide the result by the production in the state. The estimate by districts is the most valuable. The trade cares but little for the information as to the amount produced in a given state, but is anxious to have accurate estimates of production by districts or types.

The most difficult part of the report to estimate accurately is acreage. In estimating acreage for a district it is well to keep in mind what is a full crop for that district, also the largest ever grown, which represents the amount that can be cared for in curing. The amount of barn or shed room for curing is an important item, and if it has been well filled the previous year the acreage can not be largely increased unless new ones are provided. The acreage may be increased with the intention of building more sheds or barns and a bad stand make them unnecessary. It is well to watch the construction of new curing houses as an indication of an increased acreage. If they were only partially filled the previous year the acreage can be increased without new ones. Most districts under normal conditions attempt to grow enough acreage to fill the curing houses every year. The supply of plants and the weather at transplanting time are important factors in determining acreage. One will often hear that a full crop is impossible on account of a shortage of plants. A short supply of plants does not necessarily mean a short acreage. Favorable weather for transplanting is more important than an abundance of plants in most districts. In preparing plant land the average grower will have enough plants to set his crop three or four times if all the land produces a full supply. With favorable weather for transplanting and an absence of insect damage to plants in the field a half crop of plants will be abundant. With hot dry weather that kills plants in the fields after transplanting a short crop may be the result with a full supply of plants. Where machines are used for transplanting

the question of weather is not so important.

In studying condition the best method is to see as much of the growing crop as possible. This can be done by watching the fields from a train or using a horse and buggy or automobile. An automobile is preferable to a horse and buggy, as much more territory can be covered in a given time. Condition sometimes changes materially in a short time. Tobacco that seems almost a failure from dry weather during the first half of the growing season can make almost phenomenal growth when rain comes. In Kentucky and Tennessee in 1914 the crop seemed almost a failure as late as the first week in August. With favorable weather following a rain on August 8, one of the largest yields ever known was produced. A field in Henry county, Tennessee produced more than 2600 pounds per acre on four acres. The usual average for this district is less than 800 pounds per acre. A grower in Davies county, Kentucky, made 1978 pounds per acre on one hundred acres. It is not well to place the condition as low as appearances indicate when the crop has suffered from drouth during the first of the growing season. Some one has said that "Tobacco likes to seem to suffer". If, however, it has suffered from excessive rains, the chance for improvement is poor, especially if wet weather continues until the crop is topped.

Yield per acre is not difficult to approximate except when abnormally large, as it was in Kentucky and Tennessee in 1914 or when unusual weather produces an extremely light crop. An estimate made before harvest can not be relied on, as the leaf may be light or heavy bodied and this can not be determined until it is cured. The November estimates in several districts were reduced in 1915 on account of thinness of leaf.

The price per pound can be easily estimated after part of the crop has been sold. Three methods of selling are practiced in the different districts: The loose floor system, the hogshead market and contracting for the crop on the farm, or barn selling as it is sometimes called. By the loose floor system, tobacco is placed on warehouse floors in piles and sold at auction to the highest bidder. In Kentucky warehouses are required to post on a bulletin board the average price obtained with a penalty for making a false report. In South Carolina warehouses are required to report monthly to the Commissioner of Agriculture the amount sold and the price. In North Carolina warehouses are required to report monthly to the Commissioner of Agriculture the amount sold but not the price. Records of prices paid are kept in all markets of importance and are easily obtained. In Kentucky warehouses are required to report sales and price, but as all tobacco is not sold by warehouses the figures may not be accurate. Where barn selling is practiced, tobacco is contracted for on the farm and no public report is made, but each buyer keeps his own record of purchases and the price paid. All cigar tobacco is sold by this method and contracts are frequently made while the crop is in the field. The Maryland crop is sold on the Baltimore market in hogsheads the summer following production, and the only way to estimate the price per pound of a crop is to make it on the basis of the preceding one, as only ground leaves are sold the same year produced. In some

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districts all three methods of selling are practiced with the results practically the same except when there is an advance or decline in the price between the time of selling by the different methods.

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January 23, 1917.

R I C E.
By DeLancey Evans.

(Read by Mr. Estabrook in the absence of Mr. Evans)

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Rice as a commercial commodity, this season, reaches a value of \$37,186,000 and while this, comparatively speaking, is "little", this Bureau will attest the fact, statistically considered, it has certainly been "loud". Boasting of perhaps more extensive statistical data than many crops, it has maintained records, remarkable and inspiring to look upon, and from 1720 to date, the importance that rice bears to the commerce of this country, is evidenced by carefully compiled records of each season's operations. The rice area of the United States is now practically confined to the states of Louisiana, Texas, Arkansas and California. The agricultural product of Louisiana is, approximately:

Cereals.....	54%
Cotton.....	27%
Sugar.....	9%
Other	
Crops.....	10%

Of the 54% devoted to cereals, 82% is corn, 16% rice. The products of Texas, say

Cotton.....	54%
Cereals.....	37%
Hay.....	7%
Other	
Crops.....	2%

Of the 37% cereals, corn has 84%, oats 7%, wheat 5%, rice 3%, other crops 1%. The agricultural production of Arkansas approaches:

Cotton.....	40%
Cereals.....	48%
Other	
Crops.....	12%

Of the 48% represented by cereals, corn has 89%, oats 8%, wheat 2%, rice 1%.

California, some 40% of its agricultural product is devoted to cereals. Of this, 61% is barley, 24% wheat, 10% oats, and 5% corn. This year, the actual acres seeded to rice was equal in acreage to 83-1/3% of the corn area of 1914. Distinctive in its character, rice and rice area, as a rule, is but little shared with other crops, and it is thus concentrated in every state, it would appear, with systematic, painstaking effort, absolutely reliable statistical data is now not as difficult to obtain, as it might appear. Approximate conclusions, as to rice acreage or production, all that might be expected, with many crops, will certainly not fill the demands of the rice industry.

For years past, at their own expense, they have secured and maintained accurate crop statistics, and as the industry has developed, greater stress has been placed upon the importance of reliable statistical information.

With our entire system of crop forecasts, remodeled, with marked increase in efficiency, we are fast gaining the confidence and respect of the commercial world. Let us ever be mindful of the increased individual responsibilities and make that feature an individual incentive to even greater effort.

With seven Field Agents assigned the area mentioned, when but a few years ago we had but three, it would seem any reasonable demand in behalf of rice would now certainly come within the bounds of possibility.

With the rice industry constantly undergoing such changes as are developed with new areas, new and highly efficient mechanical agricultural devices, new methods, new and different varieties of seed rice, general information based upon current opinion, or estimates based upon almost any system of averages, carries with it but little weight, and but poorly indeed serves the demand of the rice industry. Specific, actual data, covering acreage and production, seems to the uninitiated, upon first glance, stupendous, and veritably impossible, yet, up to a very few years ago, annually, this Bureau could present a reasonably accurate list, embracing every rice planter in the United States, with the number of acres cultivated by each.

With our facilities increased one hundred and twenty-five per cent in the rice section over a few years back, (seven Field Agents where we formerly had but three), with six months in which to visit every rice producing county in the fairly concentrated area, compiling rice acreage by county, and in detail, setting forth names, location, variety and acres planted, is certainly not too much to aspire to, or with a little concert of action, tempered with sincere, honest effort, too much to expect, but be that as it may, you have my positive assurance that all estimates in connection with rice made by this Bureau, are invariably subjected by the trade to an actual and impressive test of accuracy, and it behooves us all to make even greater effort, and thus maintain a statistical position reliable, accurate, and invulnerable in all detail.

No. 12-1/2
January 25, 1917

COTTON.
By W. L. Pryor.

It is not known definitely where the cotton plant originated. From the early references to its use in India, it has been supposed by some that originally it came from there and spread to other countries. Others who have made a study of its origin think it might have come originally from Persia or China, later crossing into Asia Minor and Egypt. Cotton was being used by the wealthier classes of Mexico and Peru for clothing, etc., before Columbus discovered America. He found it growing wild in the West Indies, and today it is still found in the forests of several South and Central American States and in Mexico.

Cotton thrives only in warm countries. The cotton crop of the World is produced almost entirely between 40 degrees north and 20 degrees south latitude. Only a comparatively small portion of the land area of the world specially adapted to its cultivation is planted to cotton. Almost the entire commercial crop is produced in the United States east of parallel 100, a small section of British India, and the Nile valley in Egypt. These countries now furnish annually upwards of 90 per cent of the world's supply of commercial cotton, whereas one hundred years ago, they furnished less than 10 per cent. The United States now furnishes approximately 70 per cent of the world's supply of cotton, and seems well able to continue this for an indefinite period, as only a comparatively small section of the cotton producing area of the South is planted to this crop. The area of the Southern States is about 562,000,000 acres, of which at least 80 per cent is adapted to cotton production. There is planted to cotton around 35,000,000 acres annually, or less than 7 per cent of the total area of the Southern States. So that regardless of insect ravages or other handicaps, the United States will continue to furnish as much cotton as the world is willing to pay a good price for. No other country in the world possesses the advantages found in the southern portion of the United States for profitable cotton production. Combined with a fertile soil and favorable climate, there is generally an adequate supply of the best experienced cotton producing labor in the world, which under intelligent management makes this crop ordinarily one of the best paying that can be produced in any country.

Cotton was introduced into the United States long before American independence. Only a small amount was grown on each plantation as picking the seed from the lint by hand was a great task. This was generally done by the children or slaves on rainy or cold days when outdoor work was out of the question. The invention of the cotton gin stimulated production considerably, but until after the American Revolution little or no effort was made by the colonies to grow cotton for commercial purposes. Of the crop grown in 1790, 379 bales was exported. This was about one-tenth of the total crop produced that year, most of which was grown in Georgia and South Carolina.

Before the beginning of the Civil War, the crop had increased to upwards of five million bales, most of which was exported. The production in 1859 was 5,387,000 bales, about 70 per cent of which was grown in the States of Mississippi, Alabama, Louisiana and Georgia in the order named. Alabama and Louisiana each produced 90 per cent more cotton in 1859 than in 1916, and Mississippi made fifty per cent more cotton before the Civil War than was produced the past year. This comparatively large amount of cotton was produced, of course, with slave labor on new lands, and at the expense of other crops. Planters at that time thought it more profitable to raise all cotton and import all the necessities of life. Land was cheap and plentiful, fertilizer was unthought of, and there was an abundance of experienced labor, so no thought was given to conservation of the soil, new lands being cleared up when the older fields became worn out and unproductive.

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In more recent years conditions have changed to a considerable extent. Lands have become more high-priced and the use of commercial fertilizers has enabled farmers to grow splendid cotton crops on lands formerly considered worn out or worthless. Years ago only the river and creek bottoms were cultivated. At the present time, less attention is paid to the river bottom lands. A clay subsoil which responds to fertilizer is equally as high priced as bottom lands which are subjected to periodical overflows.

A temporary overproduction several years ago caused very low prices for cotton over a period of eight to ten years, and planters saw the error of the one crop system. The boll weevil also assisted, and diversification began to be practiced. It has been demonstrated that when a farmer once practices diversification he never gets out of the habit. In recent years over much of the cotton belt, cotton has become more of a surplus crop than formerly. The practice of diversification coupled with the steady progress of the boll weevil has held cotton production down to such an extent the past few years that at this time a crop of fifteen million bales is considered a fair yield for the cotton belt.

In 1892, the Mexican boll weevil entered the United States through south-eastern Texas. Today it has covered fully 60 per cent of the cotton producing area of the United States, doing immense damage wherever it has gone, cutting production from 80 to 90 per cent in sections, causing farmers in much of the southern cotton producing area to almost cease planting cotton. In its worst form, south of the 32 parallel of latitude and east of Texas, it is extremely doubtful if cotton production has been at all profitable since its advent. In the three States of Louisiana, Mississippi and Alabama, it has reduced cotton production probably 2,000,000 bales annually, the loss to the three States named the past year directly or indirectly from boll weevil damage will amount to at least \$250,000,000. Nothing at this time has been found to prevent the steady progress of the insect eastward, and it is only a question of a few years until the entire cotton belt will be more or less infested by the weevil. However, farmers are learning to successfully cope with the pest under ordinary circumstances, and there is little prospect of a cotton famine. Enough cotton can be raised in regions favorable for controlling the weevil to meet the world's requirements for many years to come.

Only about one-third of the American cotton crop is usually manufactured at home. The remaining two-thirds is exported to European countries, Japan and China. Exports of the 1916 cotton crop and its by-products, if the average of previous years is maintained, at prices prevailing on December 1, 1916, will bring into this country an equivalent of approximately \$775,000,000 in foreign gold. The 1916 cotton crop with the seed, after deducting the planting seed for the next crop, was worth to the farmers of the South about \$1,375,000,000. The cotton seed of the 1916 crop, considered almost valueless a few years ago, was worth about \$300,000,000, nearly half the value of the oat crop of the United States in 1916, and a little less than the total value of all the tobacco, sweet potatoes, rice and rye grown in this country last year. Linters, another by-product of cotton, and obtained by delinting the seed before pressing for oil, formerly hardly worth the labor to obtain it, is worth this year about \$75,000,000.

Cotton has been for years and will continue to be the main money crop of the Southern States. It is easily produced. An illiterate negro farmer can make about as much cotton per acre as a man versed in scientific agriculture. The gross returns of about \$39 per acre for the 1916 cotton crop seem pretty large when it is remembered that the crop in portions of several States was a practical failure. On the best cotton lands in the South, the returns were much higher, some sections averaging much above \$100 per acre. But almost every year, cotton is about the best paying crop grown anywhere in the best cotton sections of the United States.

Field Agents in ten Southern States must pay more attention to cotton than any other crop grown in their territory, because it is generally the most important crop commercially. They must watch the acreage, and the different

influences which may cause the farmer to increase or decrease it from year to year. Price fluctuations are violent. A crop has been known to sell for five cents a pound one year, and fifteen the next. This and many other things have an influence on the acreage from year to year.

After the acreage is determined, conditions must be most carefully watched. A cotton crop can, under favorable conditions, put on a good crop in a month's time, or can make a failure equally as quick. There are three crops, or, rather, three separate yields to be watched, namely, a bottom, middle and top crop. To make a normal yield a plant should be fruited all the way up. This is seldom the case over any large area, and hence we never have a normal cotton crop in any one state. The influence of weather and insect ravages are the main things to be watched. In addition, fertilization, the labor supply, and weather, whether hot or cold during the growing and fruiting season, and even winds or storms may determine the size of the crop.

January 23, 1917.

AVERAGES.

By
Nat. C. Murray.

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The monthly reports of Field Agents are made up almost entirely by a process of averaging. It is possible, of course, to make an estimate or guess of crop condition, yield, or production, without consciously using any mathematical process of averaging. Indeed, most of the primary estimates, upon which the Bureau's estimates are based, are so obtained. When a farmer estimates the wheat condition in his neighborhood or county as 75 per cent of normal, he does not determine mathematically each field, or any number of fields, and strike an average. Also, an agent may travel over a considerable area and estimate the condition for the entire area from his general observations, intuitively as it were, and not by any process of averaging. It is possible, therefore, to have an estimated average without going through the mathematical process of averaging. But the final estimates of the Bureau, and most of the final estimates of the Agents, are the result of the mathematical process of averaging.

The procedure of the Bureau, and of the Field Agents, in making crop estimates, is really one of sampling. A sample, that is, crop estimate, is taken from here and there, more or less at random, and the totals are averaged, either straight or weighted. The more samples, the greater is the relative preciseness of their average (freedom from bias not meant by this, however). Also, the more carefully the samples are selected, the more accurate will be the results. Field Agents by their travels over their State learn to select wisely their samples.

It is important for Agents to know about how many samples or reports ought to be obtained in any investigation. If reports are too few, the average will not be sufficiently accurate; if reports are very numerous, there is a waste of energy, as the accuracy of the average does not increase in the same proportion as the number of the items making up the average.

A fair degree of accuracy can sometimes be obtained without a large amount of data. To illustrate this point, I took at random one county report from each State, of the corn condition in October; their average was 69.1 per cent, individual county figures ranging from 10 in Kansas to 110 in Wisconsin. A second random selection was made, and their average was 68.5, individual figures ranging from 0 in Texas to 110 in Pennsylvania and North Carolina. The average of the entire list of county reports, about 2,000 in all, was 71.7; the Bureau's estimate was 71.5. This is a severe test, and shows nicely the tendency toward stability of averages, and why many private crop estimators, with limited facilities, can estimate as closely as they do the general condition of crops.

In this respect, experience follows the law of chance or probability. The United States average from the first random selection of county reports

was, as stated, 69.1, and from the second, 68.5. But the first and second figures taken from each State often varied widely - in Pennsylvania 50 and 110 respectively, Florida 25 and 100, North Dakota 90 and 40, South Dakota 95 and 30, Tennessee 100 and 50, Oklahoma 30 and 90, and so on. Obviously, with so wide variation between the first and second selection from each State, we could not place much confidence in either one, or the average of the two, to represent the true condition of the State. But, paradoxical as it might at first seem, these samples, taken from each State, may be of doubtful value as representing the true condition of any State, but may reflect with a fair degree of probability or accuracy the average for the entire United States. All of you have probably heard some skeptic of crop statistics ask, how can the Government guess the total United States condition or yield within 10 or 15 per cent, when a single farmer can not guess his own crop within that amount? - and other similar comparisons. Of course, the average tends to neutralize the overestimates and underestimates.

I have neither the skill nor time to go fully into the mathematical reason for the so-called law of averages and margin of errors, but it is an interesting study, and therefore I shall make a few suggestions, which may be followed up by those of you who might be interested to do so.

Suppose a number of reports are received at random from over the State, and suppose that each report is equally likely to be too high or too low. To make the example as simple as possible, suppose an excessive estimate be represented by 2 and a deficient estimate by 1. The first report, obviously, will be either 1 or 2, the chance of either is equal. Now suppose we receive two reports; the second also may be either 1 or 2. With the two reports there are four possible combinations. Both may be 1, both may be 2, the first may be 1 and the second 2, or the first may be 2 and the second 1. Observe that the averages of the third and fourth combinations are alike, that is, $1 + 2$ and $2 + 1$ give the same sum and average. The results may be put down as follows:

		No. of combinations.	Sum of each.	Average.
1 + 1	)	1	2	1
2 + 1	1 + 2) =	2	3	1-1/2
	2 + 2)	1	4	2
		<u>4</u>		

It is readily seen here that of the four possible combinations there is one chance in four the average will be 1, two chances in four that the average will be 1-1/2, and one chance in four that the average will be 2.

Suppose we add a third report; the possible combinations are increased from 4 to 8, because the third report is equally likely to be 1 or 2; if 1, the 1 will combine with each of the previous four combinations, and if 2, it will also combine with the four previous combinations, making a total of 8 possible. These may be presented in a tabular statement as follows:

No. of combinations.	Sum.	No. of combinations.	Sum.	No. of combinations.	Sum.	Average.
1 C =	2 + 1		)	1 C	3	1
2 C =	3 + 1	1 C =	2 + 2) =	2 C	4	1-1/3
1 C =	4 + 1	2 C =	3 + 2)	3 C	5	1-2/5
		1 C =	4 + 2)	4 C	6	2
				5 C	8	

If four reports: -

1 C =	3 + 1		)	1 C	4	1
3 C =	4 + 1	1 C =	3 + 2)	4 C	5	1-1/4
3 C =	5 + 1	3 C =	4 + 2) =	6 C	6	1-1/2
1 C =	6 + 1	3 C =	5 + 2)	4 C	7	1-3/4
		1 C =	6 + 2)	1 C	8	2
				16		

And so on. Observe that the chance or probability of the extremes diminishes, and that the number of combinations in average, as they ascend, follows the rule of coefficients in the binominal theorem. That is, say, with the four reports there are $2^4 = 16$ combinations; the first is always one, the second is the same as the number of reports received (that is, in this case, 4); the third is in this case 4×3 divided by $1 \times 2 = 6$; the fourth is $4 \times 3 \times 2$ divided by $1 \times 2 \times 3 = 4$; and the fifth is $4 \times 3 \times 2 \times 1$ divided by $1 \times 2 \times 3 \times 4 = 1$.

The number of possible combinations of even a moderate number of reports is enormous. Take, for example, the experiment of averaging one county report from each State. In each State there is an even likelihood that the one picked will be above or below the average of the State. In taking one report from each State, some will be above their State average and some below. The total number of possible combinations of one such report from each of the 48 States is over 450,514,986,950,656. The chance that all 48 will be above their respective State averages is thus one in 450,000,000,000,000. The chance that two will be above their State averages and 46 below, is 48 chances out of the 450 trillion possible combinations. The chance that three of the 48 county reports selected will be above their State average is 48×47 divided by $1 \times 2 = 1,128$ out of 450 trillion. The chance of 4 being above and 44 below is $48 \times 47 \times 46$ divided by $1 \times 2 \times 3 = 12,972$ out of 450 trillion, and so on. The result of the experiment of averaging one county report from each State was thus in harmony with the law of averages, in which there is an increasing probability of those above balancing those below average.

The increase in the precision of an average with an increase in the number of reports making up the average, follows this law of chance or probability. The ratio of relative precision of two averages is equal to the ratio of the square roots of the numbers which make up the averages, other conditions



No. of combinations.	Sum.	No. of combinations.	Sum.	No. of combinations.	Sum.	Average.
1 C	= 2 + 1		)	1 C	3	1
2 C	= 3 + 1	1 C	= 2 + 2) =	3 C	4	1-1/3
1 C	= 4 + 1	2 C	= 3 + 2)	3 C	5	1-2/5
		1 C	= 4 + 2)	1 C	6	2
				8		

If four reports: -

1 C	= 3 + 1		)	1 C	4	1
3 C	= 4 + 1	1 C	= 3 + 2)	4 C	5	1-1/4
3 C	= 5 + 1	3 C	= 4 + 2) =	6 C	6	1-1/2
1 C	= 6 + 1	3 C	= 5 + 2)	4 C	7	1-3/4
		1 C	= 6 + 2)	1 C	8	2
				16		

And so on. Observe that the chance or probability of the extremes diminishes, and that the number of combinations in average, as they ascend, follows the rule of coefficients in the binominal theorem. That is, say, with the four reports there are $2^4 = 16$ combinations; the first is always one, the second is the same as the number of reports received (that is, in this case, 4); the third is in this case 4×3 divided by $1 \times 2 = 6$; the fourth is $4 \times 3 \times 2$ divided by $1 \times 2 \times 3 = 4$; and the fifth is $4 \times 3 \times 2 \times 1$ divided by $1 \times 2 \times 3 \times 4 = 1$.

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The increase in the precision of an average with an increase in the number of reports making up the average, follows this law of chance or probability. The ratio of relative precision of two averages is equal to the ratio of the square roots of the numbers which make up the averages, other conditions

being similar. Or, the precision of an average is proportional to the square root of the number of terms contained. For example, if 5 bushels may be regarded as the probable precision obtained from 100 reports, to obtain a probable precision of 2 bushels would require 625 reports, that is, 2 is to 5 as the square root of 100 is to the square root of 625, or 2 divided by 5 equals the square root of 100 divided by the square root of 625 equals 10 divided by 25.

The point which I wish to make by these observations is that agents should seek sufficient data to secure a stable average, and should also avoid an excess of data; for after a certain number, the increase in accuracy is not commensurate with the labor involved. Both extremes should be avoided.

Crop schedules received from a general list of crop reporters distributed more or less evenly through the State, will contain many replies for crops widely grown, as corn, or hay, but only a few reports for crops grown only in a limited area. One hundred reports or less from one State regarding the condition of a staple crop, may be practically as accurate as four or five hundred reports. But a hundred reports, or even four hundred reports, from a general list of correspondents may have only one or two reports for some minor crop. The greatest efficiency in results, therefore, will be obtained by combining the system of general inquiries with special inquiries. Better results will probably be obtained by keeping a list of, say, 150 general reporters, and 10 special lists of 25 each for 10 special crops, than by keeping merely one general list of 400 reporters.

Another advantage of this combination of a limited-sized general crop reporting list supplemented by small special lists is that special lists are usually made up of persons who are best qualified to estimate such special crop.

The precision of an average is dependent upon two factors, namely, the number of items or reports making up the average, and the extent of deviation of the different items or reports from the average. For example, an average of 50 may be obtained by the following four variations:

	(a)	(b)	(c)	(d)
			40	30
	40	30	40	30
	60	70	60	70
			<u>60</u>	<u>70</u>
Av.	<u>50</u>	<u>50</u>	50	50

The reliability of these four averages is different. As the precision of the average is proportional to the square roots of the number of terms contained, the relative precision of a and c is the square root of 2 divided by the square root of 4 equals 14 divided by 20. Similarly with b and d. But although a has only half as many terms as d, namely 2 to 4, it is more precise because the deviation of the items from the average (10) is only half the deviation in d (20). The relative values of these four averages by reason of number of items and deviations combined are:

$$a : b : c : d :: 7.05 : 14.10+ : 5 : 10.$$

In regard to biased averages, it should be borne in mind that no increase in number of reports will correct the bias. A million reports may have the same amount of biased error as a thousand or a hundred. Simple as this fact is, it apparently has not always been clearly perceived in the Bureau, large lists having been built up with the apparent purpose of reducing error resulting from bias.

There is undoubtedly more or less bias in nearly all averages of reports received from reporters. This is of considerable importance in regard to our acreage estimating; of little importance in our yield per acre estimates; of little importance in our price estimates; and of very little importance in our condition estimates.

All condition estimates are compared with other condition estimates made in similar manner, and in the comparison the bias disappears. Efforts to correct the normal bias of crop reporters often results in more harm than good by vitiating the comparative value, which is the only value of condition estimates. An examination of condition reports made at time of harvest with the harvest yield estimates subsequently made shows that there is usually a close parallel between the yearly fluctuations of condition figures and yield figures - and this is the purpose of condition figures; they are really index numbers, and as such, the base number (100) might well be considered as x as a defined normal, or standard or average. It does not make any difference in results whether or not the different reporters have the same conception of the base or normal, providing their own method does not change and that the same reporters, approximately, report from year to year. The play of the law of averages takes care of this. For example, suppose we have two reporters reporting on the same area - well, say corn, and suppose one estimates the condition on the basis of 20 bushels representing the so-called normal, and the other 40 bushels. Suppose the conditions indicate a yield of 20 bushels. Number one will report the condition 100 per cent, and number two 50 per cent, their average being 75 per cent. Now suppose the conditions decline to a prospect of 10 bushels, or only half as good as before. Number one will report the condition 50 and number two 25, their average being 37-1/2 per cent, or exactly one-half their previous average - thus indicating the true change. This simple little example illustrates what actually occurs in practice. The Bureau's normal is a composite of a large number of individual ideas, but this composite is almost as stable as the yearly death rate or birth rate, which change very little from year to year, notwithstanding the health or condition of individuals varies widely.

The query has frequently been made, if the purpose of crop condition reports is to forecast yield per acre, why do you not ask the direct question, what is the condition of the crop, say wheat, expressed in prospective yield per acre? It is reasonable to believe, a priori, that averages obtained from such direct and apparently more definite question would be more precise than averages of percentages of normal condition. Experiments have been made again and again, and in every experiment the estimates expressed in percentage of normal were more precise than the estimates expressed in prospective yield per acre. That is, the average deviation of percentage estimates from their general average is less than the average deviation of the yield per acre estimates from their general average. In an experiment with oats in September two years ago in about 8 States, the average deviation of the yield per acre estimates was nearly twice that of the condition estimates, in nearly every State.

Therefore it would require four times as many reports to get the same degree or precision in the yield query as in the percentage query. The variability of estimates of yield of apples is, as I remember, about 5 times as great as the variability of percentage estimates of production. Under such conditions 100 percentage estimates are as accurate as 2,500 yield estimates. This is why efforts to estimate yield of apples by the barrel per acre or bushel per tree have failed.

I believe that little need be said about weighted and non-weighted averages. You are all familiar with the process. There is a tendency, however, to exaggerate the importance of weights. Some time ago I made weighted averages of a number of our county reports on staple crops, with rounded acreage figures obtained from the 1890, 1900, and 1910 Census, respectively, as weights. Notwithstanding great changes in the total acreages, the averages obtained from the different sets of weights were in all cases practically the same. The reason that great errors in weights frequently have little influence in the average is that in dividing the extensions by the weights the errors are in both the numerator and the denominator, and tend to cancel each other, especially if there are a large number of items. When an error occurs in the thing weighted, however, it is only in the numerator, and hence is not canceled out. I do not believe it is necessary for Agents to weight by counties, except possibly in exceptional cases. A difference between a weighted average and straight average is generally most marked when there is some relation between the relative size of the weights and the thing averaged. For example, prices of articles are often influenced by the importance of an area in production of the crop considered. Prices are usually lower in sections where the weights are relatively large. Cabbages, for instance, are low in price where heavily grown and high where few are grown. Changes in acreage expressed in percentage of last year generally vary more widely where weights are small than where weights are large. It is easy for the acreage of wheat to increase 1,000 per cent where it is sparsely grown, but impossible in many counties of Kansas or the Dakotas. There is no such connection between weights and crop conditions; hence a straight average of many reports within a State is often the same as a weighted average. In the case of township reports, which are not weighted by counties, they tend to weight themselves, inasmuch as reports for any particular crop are most numerous in areas where most grown.

January 23, 1917.

SOURCES OF CROP DATA AND THEIR RELATIVE VALUE.

By
V. H. Olmsted.

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There are three main sources of information upon which Field Agents must primarily rely for the ascertainment of knowledge to form the bases for their monthly reports to the Bureau. These have been outlined in the programme for this conference, and are as follows: (1) Written reports, (2) oral reports, and (3) personal observation.

The first source, "written reports", is provided for and covered by the blank schedules of inquiry furnished by the Bureau each month, which are used by our regularly listed Crop reporters, known for many years as "Aids", in making their reports at the close of each month as to areas, crop conditions during the growing season, yields per acre, numbers and prices of different kinds of farm animals, and prices of farm products of various kinds. These topics, briefly referred to, embrace the general, regular inquiries regarding subjects upon which information is sought, and the data elicited by the replies to these inquiries are used by the Field Agents in formulating their regular monthly reports to the Bureau, which, in turn, are used by the Bureau, as is well understood, through its officials and the Crop-Reporting Board, in the ascertainment of the final figures, every month, given to the public by telegraph, and, after considerable delay (it is said with much regret) through the "Monthly Crop Report".

In addition to the regular topics referred to, the aids are occasionally, sometimes frequently, called upon to render written reports on various special subjects, such, for instance, as cranberries, various commercial truck crops, peanuts, length of cotton staple, and many others not necessary to specify here. These special inquiries are important and produce valuable results; but it may be said, without danger of tending to lessen their importance, that the more frequent and extensive they are, the greater their tendency is to lessen the interest of the aids as a class, and to really weaken this source of Field Agents' information upon the regular topics with which they deal; at least, this has been my experience.

The second source of data consists in oral reports made by individuals to the Field Agents during the course of their monthly itineraries. This source is more valuable at the immediate times it is utilized than the first-mentioned source (the written reports of aids); the difficulty is that our reports relate to about the end of each month or the beginning of the succeeding one, and between the times when the oral information is derived and the times when reports are to be made, there may be a decided modification of the data, particularly the data relating to growing crops. If the facts were stationary, the oral reports would be immensely the most valuable, because they are given

by a class of men whose horizons are broader, as a rule, than the persons who render written reports. Country merchants, whose customers are almost wholly farmers, constantly hear "crop talk", and are usually as fully saturated with the kind of information we seek as a wet sponge is with moisture. Country bankers come within the same category; their business prosperity depends absolutely on agricultural conditions and outlooks as well as upon the final results of each year's farming operations, and they, being men of more than average intelligence, are fully appreciative of how greatly it is vital to the success of their financial affairs, whether on large or small scales, to keep constantly informed as to the various points concerning which they are questioned by the Field Agents. Also, handlers of farm products, as commission men or dealers, fertilizer dealers, officials of agricultural associations, and others identified with agricultural affairs, other than producers, are all well informed; the natures of their callings requires them to be so; and such men are, as a rule, more than willing to give free and full information for the Bureau's use. If we could enlist more of these classes of men as regular crop reporters, the monthly written reports would be much more valuable than they are. But these men are usually a busy lot, absorbed in the details of their various businesses, and ordinarily are not willing to take the time to make regular written reports; some of them have, nevertheless, been enlisted as aids, and whenever possible they are so enlisted; their reports tend to make the results of tabulations of aids' reports more valuable than they would otherwise be.

A third source of information is dependent upon personal observation, especially as to the progress of crops from the time of their planting until their maturing and harvesting. The Agent can not, of course, except in a limited way, personally observe and inspect completely the various crops, particularly in a State of such wide territory and diversity as, say, Virginia, the State in which I operate as Field Agent. Where there are one hundred or more counties, it goes without saying that all can not be personally visited; and where visited, only a limited number of fields can be inspected; but personal observation, wherever and whenever possible, is a great aid to correct judgment; and by taking typical fields in the localities visited in each of the important crops, one is able to "size up" the situation, from month to month, with reasonable accuracy. It is very essential, in fact, that personal inspections be made regularly during the growing season and up to harvest, and by taking selected fields and going to them every month the progress, favorable or unfavorable, can be noted and measureably proper ideas can be formed.

Another vital help to the Field Agent, not before mentioned, are the periodical reports of the Weather Bureau for each State. These enable the Field Agent to know at the end of each month the climatic meteorological conditions affecting the crops of various kinds, throughout the past month, particularly in localities and sections he has not recently visited. The Weather Bureau reports have been found by me to be absolutely essential to the proper formulation of reports made to the Bureau.

As to the strength or weakness of the different classes of men who make up the body of Field Agent's aids, whether their reports be written or oral, I would say that my previous ideas, entertained during the years when I was Chief of Bureau, have undergone some modification. I then had a theoretical belief that farmers as a class constituted the most dependable reporters. I knew they

were weak as to certain things, namely, acreages, yields, and numbers, but I thought their reports on crop conditions were substantially correct. My personal experience has convinced me of my error, and that the farmer is inherently a pessimist. He never thinks things are as good as they are, and is prone to report them a little worse than he thinks them to be, because he has the ineradicable habit of discounting possible unfavorable conditions, climatic or insectiverous, that may, perhaps, eventuate later. He is always a pessimist, except when he seeks to borrow money from a bank or elsewhere, or tries to buy supplies on time from a merchant, in either of which cases his opinions by some mysterious alchemy undergo complete change. No chameleon ever changed the color of his hide more quickly and completely than the average farmer can and does change his ideas, regarding crop conditions and prospects, and becomes a blooming optimist. So that I have come to realize his weakness all along the line, due to his naturally pessimistic tendency except when prompted by desire or necessity to be optimistic, and the narrowness of his agricultural horizon. I regard him as the weakest, least dependable of all crop reporters.

The best classes of crop reporters, in the order of their reliability, in my judgment, based on experience, are as follows:

1. Country bankers.
2. Country merchants.
3. Buyers and handlers of farm products.
4. Fertilizer and implement dealers; seedsmen.
5. Officials of agricultural associations.
6. Officials and agents of transportation companies.
7. State authorities.
8. (And last) - farmers.

It is of course possible that in other States the rank is different from that of farmers in Virginia and the Carolinas, and where men of high intelligence are more easily enlisted as crop reporters, the comparative reliability of the various classes of reporters may not be the same as in the States named. What I have said relates to these States only, and is not intended as a necessarily correct summing up for other States, or for the entire country.

Finally, it may be said of all classes, "they are always willing to talk, but dislike to write", and it is therefore difficult to enlist a body of aids that is wholly satisfactory; at least that has been my experience up to this time.

THE PRODUCER AS A CROP REPORTER.

By

January 23, 1917.

F. W. Gist.

oOo

The producer is subject to the same general influences which make for strength or weakness which are discovered in other classes of crop reporters. Education, close observation, interest in the subject, promptness, reliability, regularity, freedom from bias,--these coupled with the proper knowledge of the theory and practice of crop reporting will make him a good source of information; the reverse will make him an undesirable one.

His most important element of strength is his first-hand knowledge of the subject of inquiry. Of course, he knows whether he is increasing or reducing his acreage, and why. While he may not measure the ground devoted to his various crops, he has an instinctive knowledge of proportionate and relative variations. His associations are largely with his brother farmers, and, given ordinary keenness of observation, he will readily absorb the trend of his neighbors' tendencies, their relative extent, and the operations of controlling influences which have made themselves felt at home. He has an instinctive knowledge, born of long personal experience, as to what the growing condition of a crop ought to be under given influences, as well as to what extent the present stage of growth and prospect of yield is short of what we call a normal, and what he knows as a full crop. His knowledge of actual is of necessity the only accurate measurement to be had on that subject, and on that point he will speak in terms of bushels, pounds, or tons, whereas other classes of reporters will confine themselves to relative or proportionate estimates.

The fact that the knowledge of the producer extends to all the subjects of inquiry applying to his section gives him a wider range of usefulness as a crop reporter than any other class. Every other source of information is confined in interest, and therefore in knowledge, to such crops as are grown commercially, while the producer, especially in a community of general farming, is familiar from immediate contact with every crop grown. It has been my observation that practically all the replies to inquiries concerning the so-called minor crops come from the farmer reporter.

The principal weakness of the producer is his lack of understanding of the theory and methods of crop reporting, especially with reference to fixing the correct proportion of variation from the normal, or basis of comparison. While by right of first-hand knowledge he surpasses all classes in his conception of the normal, although almost entirely by instinct, by the nature of his occupation he has not the experience in reductive ad percentum, and he is inclined to reason by halves, thirds, fourths, and fifths; hence the almost universal rule of not halting between five and ten in fixing his percentage. Along this same line is his tendency to use the wrong symbols; and it may be worth while to suggest here the necessity for careful notation of his confusion of the cipher and the X mark in his expression of zero. Likewise his inclination to extend the

normal as a basis of comparison to questions of acreage, numbers, and total production, because, as a creature of habit, he does not readily switch his viewpoint as does the office-trained man. It is not so easy to correct this element of weakness on the part of the producer, because we do not meet him so frequently in person, and of course instruction by correspondence is not so efficient in his case, though I suggest as worth while frequent lessons by mail along this line.

On the subject of bias it has been my observation that with the producer it is ~~an~~ largely a question of understanding the purpose and results of the work as with other classes. In Oklahoma I found the producer an optimist, in Arkansas an extreme pessimist, in Tennessee and Kentucky rather open minded, while in Alabama continued service as reporters makes him fairly free from bias. The fact that the farmer's bias, if exercised, may be readily placed on the bull side, while all other classes may be here and there or vice versa, makes the bias of the producer easy to recognize and possible of definite discount.

Just here it may interest you to mention three experiments recently made of gathering facts instead of opinions from producers, and to compare the results with those of regular reporters. Without giving the details of collection, on the final estimate of cotton in 1915 I secured the statement of 1,238 farmers of actual acreage and production for the two seasons of 1915 and 1914. On the question of acreage their replies showed a reduction of 20 per cent, while regular reports averaged 14. On the question of yield the farmers indicated an average of 153 pounds, while the regular reporters gave 140. The relative value of this showing was accepted rather than the positive. On acreage of cotton in 1916 I received the reports of 1,749 farmers, giving actual acreage in 1915 and 1916. Dividing these between large and small farmers, the large ones showed an average of 80 per cent, the small ones an average of 103, while regular reporters averaged 101. On final yield in 1916, 603 farmers gave an average decrease in the acreage picked of 2 per cent, while regular reports indicated 8 per cent. On yield the farmers averaged 82 pounds, while regular reports averaged 77. The chief value of these three experiments is the conclusion that it is possible to get actual facts which will efficiently check consensus of opinion.

The producer seems to have an innerent weakness in his inability to estimate in quantitative amounts, which does not so materially obtain when he addresses himself to relative acreage, relative condition, relative yield, or acre yield. He will frequently estimate the production of his county in numbers of bales below those already ginned. This is evidently due to the fact that the gin reports are not available to him as readily as to other sources of information.

If the agent knows the temperament of his producers, which is largely sectional and local, they may be made the most reliable source of information. After all, the producer is the real source for all other classes of aids, and if the agent can get his knowledge first hand and handle it as careful study dictates, he has data which all statistical authorities regard as most reliable and designate as primary information.

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B U Y E R S .

By

January 23, 1917.

Paul H. Kirk.

oOo

From my few years of observation I find, as a rule, in the territory in which I have labored, though this may not be true in other states, that the men who purchase the grain keep better informed regarding actual conditions than do the producers.

This may at first appear as rather a rash statement, but unfortunately the producer looks at conditions from a much narrower and restricted territory than does the buyer. The buyer bases his opinion or estimate from a broad vision.

The buyers also realize the great financial necessity of keeping in touch with the crop from seed time to harvest, for it takes an enormous sum of money, much of it borrowed on short time loans, to move a crop.

For these reasons I consider buyers one of the best classes of reporters from whom reliable data can be obtained. By buyers I do not mean local elevator agents alone, though many of them are very observant of, inquisitive about, and interested in, crop conditions, but rather auditors and heads of elevator companies, and millers.

On the other hand it must be remembered that buyers, though honest, are often inclined to be a little optimistic because they naturally desire to purchase a crop at as low a price as possible. However, buyers' reports, as all other, should if possible be followed up by actual personal inspection.

17-A

January 23, 1917.

Handlers.
By
F. G. Kelsey.
oOo

Handlers, those handling the crop, are usually good sources of information for their immediate section. I find them pretty well posted on staple and special crops, especially . fruit, apples, peaches, etc., from the fact that large handlers and cold storage people send their buyers right into the fruit belt from year to year to buy up the fruit, either at a given price per barrel, if apples, or a given price a basket for peaches, delivered to the nearest railroad depot or snipping point. Before buying, they usually make a pretty good canvass over the different orchards to take in the full situation of how the crop is coming, taking into consideration probable yield, quality, price, etc. I have called on and talked with fruit dealers in sections where not much fruit is grown, and found them pretty well posted on the general situation of the real fruit belts. On telling them that I am a representative of the Department of Agriculture, Bureau of Crop Estimates, and asking them the usual questions for their section, their answer may be "This is not much of a fruit section, but up through"--naming different places and cities in the fruit belt --"the apple crop is going to be a large crop, a hundred per cent crop, or seventy-five per cent crop," as the matter may be, "peaches are a full crop," etc., they will then come back at me somewhat as follows: "How do you find the apple crop, or peach crop," or whatever crop we are talking about? "Well", I will say, "I have not been through that section yet; expect to be through there in the next few days." Or, "Our report of the first of the month gave the crop for the State at about 90 per cent of a full crop," or as the case may be. I have talked with handlers of apples in Providence, R. I., who had their buyers up in New York State, and knew the apple situation there pretty well compared with previous years, or how it was coming on the year in question.

While these people are pretty well posted on, we will say, apples, or peaches, handlers of some other crops in my territory, such as cabbages, potatoes, beans, hops, etc., they are only handling these crops for their immediate sections and do not have buyers out in other parts of the State, and so are better posted for their section than other sections of the State, although, of course, they have some knowledge of the crop situation outside their immediate section.

Handlers of tobacco in my territory in New York and Connecticut, are pretty well posted for their own sections. Some of them having buyers or representatives in different tobacco belts, so that they are kept advised of the growing crop from the time of first setting out of the crop up to the harvesting of the crop.

THE MERCHANT AS A SOURCE OF CROP INFORMATION.

By

January 23, 1917.

G. L. Morgan.

oOo

I presume that in the West, where agriculture is the principal occupation and a great many of the merchants depend largely upon the farmer trade, that all of them keep in touch more or less with crop conditions. But in the East, where farming is a sort of secondary consideration, I find there are but few of the merchants who can give much information of value. They are the ones dealing almost exclusively with the farmer; such as seedmen, implement dealers, produce dealers, dealers in leaf tobacco, and some of the smaller grain and feed dealers. The larger ones usually handle Western grain and know very little of the crops in their vicinity.

The seedmen might be divided into two classes, those who grow some of their seeds or have them grown for them in the territory where they are located, and those who grow outside or buy from large dealers. Those who grow some of their seeds or have them grown by farmers in the vicinity, can usually give some very good information, as they not only follow the seed crops very closely, but get around and see and hear more or less of the other crops. Those who buy from other dealers or grow them outside the state, depend more upon what they hear the farmers say as they come in, and their sales of previous years, than from observation or personal knowledge.

The implement dealers I find give some of the best information I can obtain. It is very essential that they know of any increase or decrease in acreages, or any unusually good crops or failures; so as to regulate the distribution of their implements. Some of the larger ones maintain a crop reporting system of their own, and every salesman and agent is a reporter. They send their reports to the district headquarters, and once a week they are compiled and sent to the main office. They are willing to give all the information they can, and what they do give is very reliable.

The produce dealer's information pertains mostly to the potato and apple crops, also some of the minor crops such as beans, tomatoes, onions, cabbages, etc. Most of them cover a radius of from fifteen to twenty miles. They follow the crops pretty closely and can give some good information.

I think of all the crops grown in the East, the tobacco crop is followed more closely by the buyers than any other. Each step from setting of the plants to curing, is carefully watched over by them, and many of the crops that they usually buy are visited several times during the season. They are one of the best sources of information on the tobacco crop.

As a rule the merchant is inclined to be more optimistic than the farmer, and in some cases his figures may be biased to a certain extent by personal interests, but all in all I think they serve as an excellent check on reports received from other sources.

BANKERS.

By

January 23, 1917.

F. N. Gray.

oOo

In considering under the subject, "Sources of Crop Data and Relative Value" strength and weakness of special classes of reporters, I find that the banker ranks high in point of efficiency, at least for that of all the major or staple crops.

I refer particularly to the bankers of the smaller or country towns and not to those of the large cities; because of that close relationship he occupies with the farmer in the more direct dealing he has with them in the smaller cities.

Of course, under the well known dissimilar conditions of the North and the South, agriculturally speaking, this does not apply alike over the entire country. It is, however, peculiarly applicable to almost all of the Southern States, or that part of the South where the credit system largely obtains.

In Texas, with a population close to 5,000,000, where nearly one-third of the cotton crop of the United States is annually produced, there is aside from the large number of farm owners, about forty-four per cent of the voting population of the State, tenant farmers. Practically all, including the farm owners, must have advances upon their crops and they borrow money directly, or indirectly, of the banks, giving liens upon crops, chattels, etc. It is, therefore, the prime business of the banker to keep thoroughly well informed of the acreage, condition, and yield of crops.

At least one official of every bank has personal knowledge of the condition of the crops in all seasons and usually such official can speak accurately of the crops for an entire county, and in instances, for an area comprised of a group of several counties. A great number of the bankers of the cotton States are owners of cotton plantations and tenant out their lands to white or negro laborers, or farmers. Thus, the banker is in position to speak of crops from the standpoint of both a planter and a banker. Among all the sources of information concerning crops, the banker stands preeminent in being able to quickly grasp the meaning of an inquiry and to render intelligently an answer. Among all the aids in the crop reporting service, no class of men have higher appreciation of the value of crop statistics, nor evince more solicitude for the publication of accurate statistics.

A very large proportion of my list of aids in the State of Texas are bankers, or banker-planters. In upward of eleven years' work, estimating crops in Texas, I have found the banker to be patriotic to the extent of not only giving freely his time to interviews and in replying to inquiries through the mails; but in hundreds of instances, he has preferred drives

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through the fields in his private car and remained away from his place of business at the bank any length of time until he has felt that he has conveyed the right information about crops in his county or locality.

In enlisting a banker as a crop correspondent, I have but to mail him a schedule with an addressed return envelope, and quickly the returns are made. No formalities are ever interchanged. He becomes an aid and a lasting one. There may be times, when through absence or illness he may fail to report, but never under the plea of "preoccupation", or "business preclusion" will he fail.

In discussing the weakness, if any can be ascribed, it consists only in his inability to report as well upon the minor crops in which he has no direct interest. However, concerning even these, he is oftentimes more competent to speak advisedly, than is the average merchant or farmer.

Transportation Companies -- Commercial Movement,
by
Guy Fitzpatrick.

The availability of usable data obtainable from transportation companies depends greatly on the stage of railroad development in any particular State or section and on the individual roads themselves. It will readily be seen that the securing of railroad data is comparatively easy in such States as Montana, the Dakotas and Idaho, where the railroad facilities are practically confined to two or three trunk lines either paralleling at non-competitive distances or bisecting the State; while the virtual impossibility of obtaining such data in a State that has reached the intricate stage of railroad development attained in Illinois, for instance, will be just as readily granted. As far as the individual roads are concerned the chief considerations are their willingness to give out the desired information, whatever it may be, and the form and timeliness of the data once secured. I might say at this point that in the four States the railroad data of which I am most familiar with, Montana, North and South Dakota and Minnesota, the Bureau has never been refused the important part of the information sought and that all the roads have been more than courteous and, with few exceptions, quite obliging in their treatment of our requests.

Concerning the reliability of this source of crop data it is perhaps sufficient to say that, with the usually quite efficient clerical force and the up-to-date methods employed in the auditing and statistical departments of our important railroads, matter secured from them bearing on the commercial movement of crops and live stock has been found to be quite dependable and accurate enough for all practical purposes. The completeness and amount of detail obtained depends greatly on the general attitude of the individual roads and on the conditions under which they are operated. I recently had an example of how this sometimes works out in trying to secure detailed data pertaining to the one part of my State in which actual competition exists. One road replied to my request with complete data in more detail than was really wanted and gotten up in admirable form. Its competitor was slow about furnishing any information at all and confined its statements to lump sum figures for the State as a whole and refused to meet the minimum requirements as met by all the other roads in the State. This discrepancy greatly detracted from the value of the general data and its possible uses and was not remedied until I had the opportunity provided by my recent stop in the Twin Cities to bring the matter up personally with the Traffic Manager of the Road in question. After going into considerable detail as to why we wanted the information, what we expected to do with it, and how it was to be used, this official's consent to the giving out of the desired data was received and it will probably be worked up on my return trip.

Aside from the more or less rare cases in which a Division Superintendent, Traveling Freight Agent, or some other official makes written or oral reports on crop conditions in the country tributary to their particular section of road, the value of railroad crop data is essentially statistical; that is, except in possibly affording a partial basis for future estimates it has very little value in immediate crop estimating or forecasting. In our northwest States we have found that data secured from the railroads after the crop year is over provides an excellent method of checking up on the total production of certain crops, of which I would mention particularly such strictly commercial crops as flax and wool, and to a somewhat lesser degree wheat and live stock. The very complete reports received for the past two years

from the roads operating in the State of Montana afforded information which made possible the revision of acreage figures perhaps otherwise impossible before the 1920 census. This has been found of primary importance in Montana where rapid agricultural development has taken place during the past few years and where the 1910 census figures are misleading to say the least.

Another use that has been made of the detailed railroad commercial movement data is in the reapportionment of District crop and live stock weights. With reports of the various roads of the shipments by stations I have been enabled to revise the proportionate weights so as to fairly represent actual conditions concerning the locality of production -- in the case of the flax crop necessitating a considerable and rather important change. A further and minor value of railroad data has been in its use in checking up the results of the Bureau's yearly inquiries concerning the percent of certain crops shipped out of the counties where grown.

ASSOCIATIONS.

By

January 23, 1917.

Charles S. Bouton.

cOo

For the purpose of this article let us regard an association, either as a body of people organized for the promotion of an economic purpose, or as a combination of such bodies. The most common varieties with which the members of the Bureau of Crop Estimates will come in contact are the selling associations of groups of producers. These will ordinarily exist for the disposal of some one crop, as potatoes, strawberries, or melons. Sometimes they are more ambitious, and will have names like these: The Jefferson County Truck Growers' Association, (thus showing the association is interested in more than one crop) or, The Arkansas Sweet Potato Growers' League, which shows at once that while the association is interested in only one production, it covers a territory state-wide in its scope.

Sometimes the association is both a buyer and a seller, with an admixture of fraternal and paternal elements, like the Grange or the Farmers Mutual Benefit Association. But for the great majority of them selling is the principal object, and the other activities that are added, such as supervision of systems of planting, cultivation and harvesting, are merely accessories of the principal object, meant to render its attainment more sure and easy.

It will at once be apparent to any one who thinks upon this subject that those associations which ought to be of most benefit to this Bureau are the strongest, oldest, best organized and most influential. An association covering a wide territory gets reports from many sources on acreage, crop conditions and prices that are reliable, because self interest and all other considerations dictate that branch associations should give the head association the fullest and most accurate information in order that the head association may be enabled to do its best work. The big associations have the machinery for collecting this data. The reporter or Field Agent can obtain from the head office on one trip, reliable, first-hand information which he would otherwise only procure at a great expense of time and money.

Local associations, acting independently of each other in contiguous territory, are not reliable sources of information when taken as a whole. Competition and a desire to make each member think that his association has done better and is better than the neighboring associations, is responsible for much exaggeration both as to production and as to prices received; and the remarkable thing is the degree of success that accompanies these efforts to mislead or misinform the members of local associations. In my state, the sales agent of these local associations is frequently a broker from some outside point who knows how to get good recommendations, though he does not deserve them. In addition to his stipulated compensation, he often manages to knock down an additional five to ten per cent on the gross sales. He is the usual source of information. Will much reliability attach to his statements even if given in confidence to a Government agent?

Of course, in either case, whether the association is large, or small, the reporter must weigh his sources of information and know what degree of credibility to allot each before adopting their figures.

Other advantages of the large association over the small is that the officers of the large associations are usually men of more experience, intelligence, force, capacity and reliability than those from the small association. They are men who have attained their present positions through the business processes of selection and elimination. More than that, they are on the job, if not the year through, at least for much longer periods than the migratory or temporary variety which directs the destinies of the local or independent associations. Hence, they are more accessible, and much more apt to have their information tabulated and in procurable form.

At this point I wish to distinguish between two kinds of associations, each of which may be large, well-managed and successful. One is the pure cooperative type, whose sole business is to benefit the member and producer; the other is the pseudo-cooperative type, whose business is to help the member and producer, but a large part of whose effort is directed toward paying fancy salaries to its officers and procuring dividends on stock whose control may be in a few hands, or hands outside of the producers. As between reports received from these two types of organizations, I should lean very largely to the pure cooperative type for credibility.

From our point of view there is one weak point common to all associations. They are very poor reporters during their busy season, and that is usually just when the Bureau wants its information. But their officers I have found well disposed toward giving information when personally interviewed.

Recapitulating, these are the points to be noted:

1. Those associations we most often touch are selling or marketing organizations.
2. The best of these, for reliability and for economy of time and money to the reporter, are the largest, oldest and best organized.
3. The local or independent associations as a class are not reliable if accurate information is desired.
4. Pure cooperative associations render most efficient aid.
5. Personal interviews necessary to get best results.

STATE AUTHORITIES.

By

E. A. Logan.

oOo

January 23, 1917.

There has apparently been a natural antipathy in past years between Federal and State officials. The disposition recently has been to hook up these activities. While there is no collusion between me and the Missouri State Board of Agriculture, I do not go ahead without comparing from time to time our estimates.

The strongest point in their estimates upon crops seems to be in the condition and yield per acre figures. These figures are derived from about the same number of aids as upon my list and run very close to my own conclusions on practically all crops. Acreage figures do not agree with ours. There seem to be no effective measures taken to reduce the bias in estimating acreages. Taking the four heaviest acreage crops, their figures show much the same tendency. Contrary to expectation, their total acreages of these four crops are less than our totals for the same. Corn acreage is larger than ours and it is difficult to determine the cause. Their figures for wheat, oats, and hay are much less and I am not so sure that we are altogether right. This is true especially of oats. Since 1913 when their acreage was about one-half our estimate, there has been a heavy increase in their estimates, nearly equaling our own figures in 1916.

The weakness in these figures in gross appears to be the varying acreage totals of the principal crops when it is very sure that they have remained quite constant considering our crop system. Wide variations occur in the minor crops and afford but little assistance.

Live stock figures are very unsatisfactory. There are no estimates of actual numbers made, only percentages of last year. Taking the figures as published for 1914, 1915 and 1916 for hogs, there would be on hand December 1, 1916 only 55 per cent of those on hand December 1, 1913. For cattle there would remain but 56 per cent, and for sheep 68 per cent of their 1913 totals. A few more years of this method will see the entire decimation of our live stock. According to present calculations, there are almost as many sheep in the state as cattle, when all sources agree that sheep have very materially decreased. These estimates are of no assistance in estimating live stock. Figures are given for horses and mules irregularly and give little if any help.

Assessor's returns are made for live stock only and are always a year and a half late. They are reasonably accurate as far as they go, but are taken upon a different basis from the Federal Census and vary widely from that enumeration. Their value lies, however, in the comparison from year to year of the counties and the state total. They show the direction of the movement over a term of years. Their weakness is in being so far back of the using date. It is reasonable to assume that the same proportions have been maintained between the census and the assessor's returns during recent years as existed at the taking of the census in 1910. Calculations may then be made to secure what might be termed estimated census figures. Comparison with these estimates give me some idea

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of the live stock movement. Of course, they are ancient history in part.

The strongest state figures in Missouri are those for crop conditions and yields per acre. Acreage figures do not agree in tendency with ours in the main. Our figures, such as those on wheat, oats and hay may be too high.

The weakest points are the acreages of major crops and the figures on numbers of live stock. There are indications of improvement as to acreages, but not for live stock. It must be said that the section of the Board handling this matter have other duties to perform. They have no opportunity to rectify the seeming natural bias by personal observation or interviews about the state.

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January 23, 1917.

By
Frank Parker.
cOo

The giving and accepting of general crop estimates from agricultural workers is not a good practice. Yet there are among this class of men those who are able to give more valuable information than may be secured from any other individual source. One must study them with more care than he gives to his regular aids.

Agricultural workers are either wide awake or dormant. General or specialists. Broad or narrow. Field or office men. Their education and environment in young manhood helps to determine the reliability of their data.

The information desired would naturally debar many. Special data may often be secured most advantageously from the specialists. The present day demands agricultural workers whose eyes and ears are open to new ideas. Frequently such men are very busy, and yet will give attention to those having good information to offer, and in turn may willingly, though guardingly, reciprocate. In my own state, the soil, climate, crops and farm practices are extremely variable. One who travels much for data soon confuses data due to these conditions. Only one who allows for variations and is truly interested in and understands crops may offer reliable information.

We have many men in the field extension and States Relations Service. My State Department of Agriculture, North Carolina, has several test farm superintendents and agronomists who are constantly offering advice and hearing about crops other than their own immediate charge. The County Farm Agents, if wide awake, are often able to furnish helpful information. As a general rule, however, these men are awake primarily to special phases of agricultural work. The strength of these sources of estimates lies in the fact that these men are more truly awake to and observant of special conditions than either the farmers or we Field Agents are. Their judgment is often the result of many estimates acquired similar to our own, though perhaps from more valuable sources, considering the interpretation they are in position to understand. They are good for comparisons and are more reliable than estimates from the average correspondent. These men are usually selected because of their practical and theoretical knowledge of agriculture and understand or comprehend the significance of estimates and figures as applied to them.

The weakness of such data is due to the specialized attitude held by such men. They are apt to be indifferent or careless of phases or factors that to us are important. They can be used only as special sources of data. In the case of men like the county farm agents, the estimates are likely to be optimistic, inasmuch as they work for and deal with large yields and improved methods.

Considered as a carefully selected class, they are invaluable. To me they have been a great aid. Often I have been able to get more accurate data from them than from any other source, being careful of and familiar with the peculiarities of those approached.

January 23, 1917.
Tuesday - 12:05 P. M.

SPECIAL METHODS FOR PARTICULAR
CROPS.

SUGAR CANE.

By
J. S. Dennee.

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Sugar cane grows more or less over the whole of Louisiana, but as a commercial crop for the manufacture of sugar, the industry is limited to some fifteen to twenty counties, or parishes as we term them in my State, situated in the southern and southeastern portions. The crop though small when compared with the crops of Cuba, Porto Rico, and Hawaii, is nevertheless a conspicuous and important one in the State and nation by reason of Louisiana being the largest producer of cane sugar in the continental United States, and then too, because sugar has long been held by our national government, from time to time, as an ideal revenue producer. Hence the condition and welfare of the crop are closely watched during the growing period by many interested persons within and without the State; and, in consequence, no difficulty is encountered in the matter of finding many well-informed parties willing to tell what they know regarding it. The sugar planter, however, is not as a rule a cordial and liberal contributor to the government's efforts to secure crop data. His ups and downs during a long experience with disastrous river floods, his financial losses from time to time through inadequate tariff, and other afflictions beyond his control, have brought him to the verge of ruin and rendered him a cynic, unfriendly at times towards our efforts to collect data. He does not regard himself as a farmer and quickly resents the inference; his enterprise is in a sense unique, being conducted by a high-salaried manager, and field managers, and a host of negro tenants, the last-mentioned being a part and parcel of his estate and working for shockingly low wages; the planter himself being the executive head. He rather assumes the role of an obstructionist in so far as the field agent is concerned, preferring not to give the information himself and objecting at times to his managers giving it for him. He is frank in his statements that he does not see the use or the need of the report anyway, since he already knows all he cares to know respecting his own place through his manager, and in the matter of his competitors' places, as a general thing his competitors are his personal friends and he meets them at his club in New Orleans, where he obtains the information direct, or he may get it after a fashion through the columns of the sugar planters' journal.

Practical experience through three sugar seasons in Louisiana has conclusively taught the field agent there that no application of general methods on our part achieves much in obtaining crop data from the sugar planter. Unfortunately our general schedule is so clogged with crops which hold no interest for him that rather than wade through the labyrinth of queries to find the one respecting sugar cane, he ignores the general schedule in toto, and that notwithstanding the field agent has endeavored to simplify matters for him by placing on the schedule with a rubber stamp an index finger pointing to

sugar cane, accompanied with the notation - "Report desired on this crop only".

And experience has further taught the Louisiana field agent that the sugar planter falls easily for a specially prepared schedule bearing on his own crop exclusively. The planter experiences no difficulty in answering the questions; his lands are well-surveyed and he knows quite well just what acreage he has under cane. And he is a splendid judge of condition, too, and he will tell it when presented with a special schedule. A concrete illustration of the effective value of the specially prepared schedule is to be found in last season's work, when the Louisiana field agent mailed about 250 special cane crop schedules to important cane growers and received from them over 140 replies, including much information, too, regarding their corn crop, which query relating to corn was attached as a rider to the cane crop enquiry. Previous experience on more than one occasion had demonstrated to the satisfaction of the field agent that 250 general crop schedules carrying a sugar cane enquiry away down somewhere near the tailend of the schedule would produce generally not over 25 replies.

Anyone, I believe, who has been associated a couple of seasons or longer with the cane crop has little difficulty in determining growing condition. The cane crop is not difficult to understand when one has become familiar with it. The fields are oftentimes laid out with a splendid precision and well cultivated. Thousands of acres are adjacent to the railways and the highways, rendering observance easy from the coach windows and from automobiles.

A personal acquaintance with the sugar planter is a big factor in the gathering of data relating to his crop, and the telephone is often an excellent medium. But the field agent must know the planter before phoning him, and understand his idiosyncracies if he has any, else a cool reception will be the result and no good attained. If the field agent has the honor of the planter's acquaintance and has not the time to visit him in person, the field agent need have no feeling of delicacy in calling up the planter by phone at his country home at any reasonable hour, and the planter will tell him cordially and honestly whatever is of interest pertaining to the cane crop.

Another good method, and a special one I believe, is to keep in touch with traveling salesmen selling the plantation stores, and more particularly the fertilizer salesmen. These latter are frequently well-informed on crop conditions, and, in a general way, they have some good ideas of acreages too. Country merchants operating independent stores in the sugar zone also can be relied upon to possess a good fund of knowledge concerning the cane crops in their locality.

And it is well to take at least one automobile ride through the more important sections of the cane belt at the height of the season. I know of no better way to observe the crop and to study it at close range, since the crop estimator may stop whenever and wherever his judgment may dictate to make a closer personal inspection of areas justifying.

During the growing season the field agent should be a close reader of the news items emanating from the sugar belt. Such items often appear in the daily papers, and if the news items indicate radical change in the condition of the crop in given localities, the field agent can easily trace the reports and confirm or disprove them.

At the beginning of these commentaries I said that sugar cane grows over all Louisiana, and that the commercial crop is limited to some fifteen to twenty parishes in the southern and southeastern portions. In Louisiana there are sixty-four parishes, so it is plain only about one-third of the State produces the commercial crop. Outside of the strictly commercial area the sugar fields are small, ranging in size from a half-acre to perhaps ten or twelve acres. Those small patches of cane are mainly in the northern part of the State, and the crop when harvested is used exclusively for syrup. Climatic conditions in northern Louisiana differ somewhat from those of southern Louisiana, especially in the matter of rainfall, and, in consequence, it is not uncommon for northern Louisiana farmers with syrup patches to report on the general schedule sent them by the bureau a growing condition altogether at variance with the reports emanating from the big sugar plantations of southern Louisiana, which condition reported by the north Louisiana farmers if taken into consideration by our bureau in the determination of a condition figure results too often in a conclusion which by no means represents the true condition of the commercial cane crop.

In the gathering of cane crop data in Louisiana, I can not too strongly stress my belief that the use of the general schedule at present employed by the bureau should be discontinued as soon as possible, and a special form applying to the sugar cane crop only be substituted therefor.

25-A

CITRUS FRUITS.

By

January 23, 1917.

C. C. Hare.

cOo

The orange and grapefruit crop of the United States for the season 1915 and 1916 amounted to about 23,500,000 boxes, of which Florida produced 8,200,000 or approximately one-third of the total. I cannot give the acreage in either California or Florida, but this is immaterial, particularly in Florida, since nobody figures on the production per acre, but per tree.

The census of 1910 gives California 6,615,000 bearing and 2,100,000 non-bearing orange trees; Florida 2,700,000 bearing and 1,100,000 non-bearing. The production per tree for the census year was approximately the same; i. e., about two boxes per tree in each state. I am taking for granted that everyone present knows that the production of citrus fruits in the United States is confined for the present to these two states, though Texas, Louisiana, Mississippi and Alabama are fast increasing their plantings of satsumas and bid fair to compete very soon for a considerable part of the market.

The work of forecasting Florida's citrus crop was only inaugurated a few months ago, and the value of the methods employed remains to be proven, though I believe that we are on the right track. The first step taken was to ascertain by special inquiry, the average production per tree for the season 1915-16 and the percentage of a normal yield which this represented. The probable yield per tree and the per cent normal was also asked for the present season, as was the per cent increase in bearing trees since the census year. The special inquiries were not sent out to a miscellaneous list, but to a large list carefully prepared. This list was composed of:

- (1) Officials of the Florida Citrus Exchange (County, sub-exchange and packing house managers). The exchange has a packing house at each important shipping point.
- (2) Independent packers.
- (3) Individual growers.

The list of individual growers was selected with great care, being made up largely of men who had written to the State Experiment Station or to some of the Government stations for information, thus evidencing the fact that they were live, wide-awake men.

Replies from each source were tabulated and an estimate for the state made on the basis of each, then an estimate combining all sources was made. There are a number of firms and individuals who make estimates of production every year; their opinions as to the size of the crop were secured and the final estimate was based upon all of these sources. It may be interesting to you to know that the estimate from growers' replies was about midway between that made from replies by the Citrus Exchange, which is always inclined to underestimate, and those from independent packers, who are also buyers, who nearly always over estimate.

The only check we have against our estimates of production, are the shipments reported by the railroads and express companies, an allowance of 9.4 per cent being made for express and less than car load movement, the average for the past several years.

One important fact, however, must be remembered:- making a citrus crop and shipping it are two different matters. Not all fruit produced is shipped by any means; the amount shipped depending more upon price and weather conditions than altogether upon production, as is the case with cotton and most other crops. Every bale of cotton produced is ginned and counted, but unless prices are good, much low grade fruit will never be shipped nor even packed.

We have an instance this season of the shipments being affected by price. At the beginning of the season the price of both oranges and grapefruit was good, and a great deal of immature grapefruit was hurried to market, the early season movement in this commodity being very much larger this year than last. As a consequence the market was glutted with green fruit unfit for use, prices slumped and shipments stopped. Very little low grade grapefruit will now be shipped, since it will not pay the charges, while high class fruit is in demand.

Exactly the reverse is true of oranges. Prices have ruled good and much low grade (not green) fruit has been shipped which under low prices would never have been packed; consequently we are making a small grapefruit crop out of a fair one, and a good orange crop of a rather small one.

I might add that a resolution was passed by the Board of Directors of the Florida Citrus Exchange, directing that all officials of that organization cooperate with this Bureau in every possible way.

Hemp,
by
Lucas Moore.

The hemp crop of Kentucky is a striking example of ability to "come back" after a period of non-production. As illustrative of how nearly the industry had disappeared, through a combination of low prices for hemp and relatively high prices for substituting crops, such as tobacco, it is interesting to compare production in the past and note the decline until within the past few years when production has increased by leaps and bounds.

According to the census of 1890 Kentucky grew 24,000 acres of hemp, which was practically the production of the United States at that time. By 1900 production had dropped to 14,000 acres, while in 1910 there was less than 7,000 acres grown. Since 1910 the decrease each year continued until our estimate for the year 1914 showed but 1,675 acres. The revival began with the high price realized for the 1914 crop and in 1915 there were 7,291 acres grown. In 1916 the crop began to show something of its old time form when 13,559 acres were sown. The present indication is for a substantial increase in 1917.

The acreage, at its maximum, is small when compared with other crops but we should bear in mind it is all produced within a boundary in central Kentucky which embraces 14 counties and that six of these counties produce five-sevenths of the entire crop.

This concentration of production is, of course, quite favorable to gathering information bearing on acreage and yield. I have had hearty cooperation of both dealers and growers and am reasonably sure of our acreage estimates. In the small producing counties I have usually found some leading grower who was willing to make an enumeration of the acres in his county. In the large producing counties the dealers probably keep in closer touch than is the case with handlers of any other crop and I have always had the benefit of their acreage estimates. The distribution of seed is limited to a few dealers and sales of seed furnished is an excellent check on acreage, since the amount sown per acre is uniformly the same.

An estimate of yield per acre, however, is difficult for the reason that the final outturn may vary widely from what was present in the crop at cutting time. Estimating yield of lint is not easy at any time and when it is further complicated by the fact that the actual yield may be affected 25 to 50 per cent by delay in breaking out the crop after the retting process has been accomplished, the hazard of a preliminary estimate is apparent.

The crop of 1915 was in both yield per acre and quality of fibre probably the best the State ever grew. A contributing cause to this, for which sufficient allowance was not made, was the fact that the land had had a long rest from hemp growing was for this reason in the very best producing condition; joined with this was an ideal growing season, and the happy combination was made complete by favorable weather conditions surrounding the retting and breaking processes. So harmoniously did these forces work that a commercial estimate of this crop which I was able to complete about the first of last December showed all records of yield per acre broken and a total production considerably in excess of all preliminary estimates. This result called to my mind an old saying which runs like this, "give a certain malefactor sufficient rope and he will hang himself," and I began to wonder if the same thing might not happen to the Field Agent through the medium of the raw material. However, we shall persevere in the matter of these annual commercial estimates, taking refuge when necessary behind the difficulties spoken of.

APPLES.

By

January 23, 1917.

E. T. Marchetti.

I have been especially interested in the apple inquiry the past two years for two reasons. The first and principal reason was to secure the best and most accurate results possible on a new and enlarging inquiry to satisfy those engaged in the apple industry of the accuracy and sincerity of the Bureau; and secondly, as a campaign of education for the prospective cooperative aid and to pave the way and assist the coming apple specialist in surmounting preliminary discouragements.

I found the district horticultural inspectors the most efficient and accurate source of information, who not only combined the technical knowledge of themselves and their assistants, but also secured the cooperation of many of the individual growers in the compilation of their estimates, and in several districts prepared actual acreage and variety enumerations.

The second most satisfactory source of information was the various Cooperative Grower Organizations and Fruit Exchanges. These organizations generally prepared a monthly estimate of the production of fruit of the individual growers under their jurisdiction, to prepare for the marketing. prospective shipping tonnage of the crops.

The results obtained by securing a total tonnage estimate of all the shipping organizations of each district, were a very satisfactory check on the estimates prepared by the horticultural inspectors.

Another valuable source of information was the railroad estimates, which, however, were generally a combination of the horticultural inspectors and shipping organizations' estimates, aided by estimates of large growers and men well informed in their respective fruit areas. The railroad's records of total tonnage shipped out of the various districts were excellent yearly checks, barring the tendency of railroads to include duplicate shipments of individual cars which loaded at several shipping points and duplicates of cars that transported apples into storage and later transported them to markets.

Valuable assistance was also secured by me from dealers in fruit supplies, commercial clubs by product factories, nurseries and individuals, such as large growers well acquainted with fruit conditions, who made estimates for more limited apple areas.

The information of the nurseries on varieties and number of trees sold into each district for several succeeding years, was of considerable assistance, especially in establishing the drift from one variety to another.

The total of the number of trees sold into the various districts, was not of as much value as was at first supposed, as there was considerable unsegregated duplication due to the fact that a portion of the trees sold supplanted those that had died and these figures contributed to a tendency of securing too great an acreage when reduced.

The individual grower was, of course, of great assistance in determining local conditions and typical farm average yields from one year to another. The apple grower represents the non-plus-ultra of cooperation, generally a retired professional man or woman, with an understanding of the value of and necessity of accurate estimates, and not influenced by malicious criticism. They will eventually be one of the important mainstays and supports of our Bureau.

I also maintained a corps of aids on the regular aid forms, segregated into fruit organizations, horticultural inspectors and growers, whom I utilized for special reports or when there had been a change of condition succeeding my visit into the district, or when I was unable to visit each individual district each month.

Personal observation, as it did with other crops, was an important factor to eliminate the pessimistic reports of a grower or buyer, succeeding a frost or other damage, or an optimistic one when conditions were extremely favorable.

These comments are for the Pacific Northwest, and may not prove applicable to every portion of the United States. Each agent must, or probably has, worked out various different means of securing this valuable apple data and the destiny and success of accurate results lies in the individual method which each agent finds the most successful for his individual and typical territory.

ESTIMATING CRANBERRY CROP.

By

January 23, 1917.

V. A. Sanders.

oOo

My first visits to the cranberry area brought me but slight knowledge of the crop in question, or of the industry in general. Most of the growers were back in the woods and marshes--quite inaccessible to me. Most of the few whom I found either knew nothing of our service, or were unwilling to give me any information. The peculiar type of Cape Cod reticence impressed me as worth analysis and further acquaintance. This was in 1913.

During the cranberry season, 1914, a few more growers were met; some of them induced to discuss our service and possible cooperation with us, questioned its usefulness and doubted the value of wasting time with me in giving any estimates on the crop. A special inquiry covering extent of blossom, damage by insects, weather influences, and estimates on the crop, was sent 300 growers; and a report made up from the 141 returns. This seemed to put our service somewhat more favorably before the growers, although it was criticised as issued too late.

Season of 1915; visits, general and specific inquiries, and acquaintance had been made over nearly all the cranberry area. Knowledge of what localities produced the crop, of methods used, and a working understanding of the crop was obtained. The following form of schedule was decided upon after thorough conference with the director of the Massachusetts Experiment Station bog and the president of the Growers' Association.

The consensus of opinion was that 2 reports each season were sufficient, to be checked up later with completed shipment figures. The Growers' Association, an all-inclusive body, has its annual meeting about the 22nd of August, and they want the first report out at their meeting. They too make a mail inquiry, but check up with ours. The final report is to be made as soon as harvesting has been about finished--usually about October 12 to 20.

The August schedule:

1. Date bog was last resanded. (b) Date winter flowage was let off.
- (c) Dates of damaging frosts. (d) Part of crop lost from frosts.
2. Insect injuries:-- (a) kind; (b) extent.
3. Bloom; light, medium, or heavy.
4. Dates of full bloom; Early Blacks; Late Howes.
5. Bloom better on Early Blacks, or Late Howes.
6. Spraying done; amount, results.
7. Quality of fruit.
8. Fruit; earlier, or later than usual.
9. Your 1914 crop; total number of barrels you had.
" 1915 crop; estimate of barrels now promised.
10. What per cent of your crop will be Early Blacks, Late Howes.

This schedule had too many detailed questions; 150 out of 520 growers reported. An invitation was given me to attend the annual meeting of the growers, and the report made up from the above replies was read after an explanation of our service had been made. Friendly discussion followed, and greater assistance was promised.

Growers and others were not satisfied with figures on the acreage of bog, and had suggested the possibility of a compilation of acreage as listed for taxation on the town valuation lists. Preliminary inquiry late in 1915 showed that it could be done.

During the early months of 1916 the names and addresses of bog owners, and the amount of bog each owned, were copied from the valuation lists in all towns having cranberries. I became convinced that the acreage as thus made up was very nearly correct--considerably more so than the Census, because of the thousands of parcels of bog under 1 acre, some of which must inevitably be missed by any enumeration except from record. For all but a few smaller towns I copied the figures personally. This took me into all the cranberry area, and gave me a fairly intimate acquaintance with the growers, an understanding of their way of thinking, and a grasp of the industry. There are 2 classes of bogs; large acreages under one ownership, usually well managed, having good to best flowage facilities, and capable of producing in ordinary seasons a large part of the total crop; thousands of parcels of bog owned by individuals, some well managed and productive, but mainly neglected, with poor flowage and producing in ordinary years but lightly, yet in wet years capable of producing good crops.

The August 1916 schedule had these inquiries: Date winter flowage was let off; insect injuries, kind and extent; bloom, light, medium or heavy; set of fruit, light, medium or heavy; dates of full bloom - Early Blacks, Late Howes; fruit reasonably uniform in size; development of fruit, earlier or later than usual; number of barrels you had 1915; and estimate of what your crop now promises; part of your crop will be Early Blacks, Late Howes. Thirty-nine per cent of replies were received. A report made up from them and containing a summary of the acreage figures compiled was presented at the annual meeting of the growers. Later their president sent a letter expressing appreciation for the service rendered them, and stating their readiness to assist us.

The October, 1916, schedule had these inquiries: Date you began harvesting this year; dates of damaging frosts since September 1; estimate number of barrels you lost by the frosts; crop run of fruit; small, medium, or large; berries, green, poorly or well colored; berries, of good keeping quality; rot, amount, in what varieties; your 1915 crop, barrels; your 1916 crop, barrels. The report from this inquiry brought another letter of commendation for the service and its usefulness to growers and others.

Main difficulties: To get reports enough to be closely representative for the whole crop; to judge shrinkage after harvesting; to determine the proportions and relations each year between the 2 classes of bogs so as to interpret reports correctly. A larger mailing list is contemplated, both to get more reports and to get our reports back to more growers.

Shipment figures become available about July for the previous crop. The quantitative estimate is made by comparing the crop with that of the previous year.

SOURCES AND RELATIVE VALUE OF CROP DATA.

BY

January 23, 1917.

J. J. Darg.

oOo

There are many sources of information from which the agents of the Bureau of Crop Estimates can gather data relative to the acreage and condition of crops. Many of those sources are reliable and a few are not to be depended upon, as their means of observation are very limited.

One of the most reliable sources of information regarding acreage and condition is to be had from farmers--wide awake, practical farmers who follow up-to-date farming. Especially is this true where rotation of crops is followed. Where rotation of crops is followed there is but little change in the acreage from one year to another, and the Agent in whose territory rotation is followed is lucky, as he is not handicapped by a large increase or decrease in the acreage one year compared with the previous year.

Farmers do not hold back the information on their crops, which the Bureau seeks, as they did some years ago. They used to think the information the Bureau published operated against them, but now they see it in an entirely different light and recognize the fact that it is to the interest of the farmer to give to the Bureau all the assistance possible. I therefore claim that the farmer's information on acreage and condition is the best of the sources from which information is derived.

Another source of information which is fairly reliable is the Mills and Elevators. They are in a position to pass on the yield per acre and the quality of the grain, and I have always found them ready and willing to answer questions relative to quality and yield.

Agricultural Implement Dealers are a source of information that can be relied upon. They have their agents in the field who report to them the outlook as to crop conditions, so that they may know where to ship their implements. It would be poor business for a large implement dealer to ship to a state where the crop was practically a failure. They, like every large business are interested in the Government Crop Report, and they scan it eagerly for information they desire. They, too, are willing to tell what they know as to acreage and condition of crops.

Bankers, especially the bankers in the North-west, are well posted on acreage and condition, as they loan their money on crop prospects and must, if they do not wish to lose their money, watch with the closest attention every movement of the crop until it is harvested and their money paid back. They are always willing to tell what they know about crop conditions.

State Officials I have always found to be willing to help the good cause along, but they get their information principally from farmers who drop in to see them for some cause or other; hence you will perceive that it is again the farmer who is to be depended upon. The Assessors are looked upon to be good sources of information, but in my territory the assessor's figures are not summarized (they are simply kept at the county

seat in the Treasurer's office), and it would require at least a week at each county seat to copy the figures of interest to the Bureau. In some counties horses and mules are put down simply as "stock". In some states the assessor's figures are a good check on acreage when the agent knows how to take them.

Hardware merchants are another source of information that can be fairly relied upon. They come in contact with farmers daily, and crop conditions are always brought up in conversation, so that the merchant, enlightened by what he hears from the farmer and his own observations while driving out on Sunday afternoons, is in a position to give to the agent an estimate which will enable him to check up the other estimates he has already received.

VALUE OF CROP DATA.

I have to some extent covered the value of crop data in giving the sources of information, but I will say further that farmers would suffer most were the Government Reports discontinued. They are not so well organized as other lines of business and so the data gathered by the Bureau of Crop Estimates benefits them both directly and indirectly; directly, by keeping them posted on crop prospects and prices outside of their own localities; indirectly, because the reports published by the Government are free from bias. Private reports, generally speaking, are gotten up for self-interest.

The knowledge gathered and published by the Bureau of Crop Estimates respecting acreage and condition enables those who neither buy nor sell farm products to distribute their goods to sections where crops are good and where farmers and others have money to buy, so you will readily see that everyone is either directly or indirectly benefitted by the dependable reports the Government publishes during the crop season.

30-A

January 23, 1917.

FIELD AIDS.
BY
Z. R. Pettet.
cOo

punctuality, continuity, and enthusiasm among crop reporters can be readily discerned from our check sheets. Honestly we note from careful editing and comparing with results of our travel. For knowledge of the dignity or standing of the reporter, we can depend largely upon the person who recommends him. In the case of reporters obtained by the method of broadcast canvass of postmasters and bankers' lists, we find they usually rank well. Those recommended by old correspondents to take their places are best of all, while volunteers, coming we know not whence, are usually unfit or drop out. Persons selected from special lists, such as fruit growers, owners of thoroughbred stock, etc., seem to rank above the ordinary.

Accuracy, with its causes of education, training, experience and judgment, knowledge of special crops, we can tell from comparison of reports with personal knowledge, together with remarks and recommendations and what is called internal evidence. To sum up, our estimates of the reporter obtained by mail, without personal contact, we may say that we have a good check on him in all, but the more minute individual characteristics.

Following the same list of desired traits as we get them from personal contact, we find we are not able to judge accurately or forecast either the punctuality, continuity, or enthusiasm. The very persons who are most punctual and exact in their own business cannot spare the time or will not write a report. They may be willing to spend half a day and furnish a car free of expense to show the crops, when the spell of the agent is upon them, but when he is gone, he is often forgotten. It is, therefore, necessary that the agent make him a friend, or few and scattering reports will be forthcoming.

The method of direct selection has its chief advantage in the determination of personal conditions, habit of thought, etc. Dishonesty may be surely perceived and may be quite accurately gauged. In fact, I believe it becomes second nature for the agent to separate the honest from dishonest without any conscious effort. By this method there is little chance that an unworthy correspondent be chosen or remain long on this list if selected. In the last division, education, experience, training, special knowledge and its resulting accuracy, personal contact will give us a better idea than can be obtained by mail.

In the morning's discussion, the strong and weak points of various types of reporters have been thrashed out. However, there are several types of reporters which have not been mentioned, each of which has its own marked individuality. The most important of these I believe are the Rural Carriers. These are men largely drawn from the more intelligent farmers, many of them living on or conducting a farm in addition to their duties. Their wide range of observation and their opportunity of meeting practically all the farmers along their routes gives them the best line on

the crops of any type of reporters, or at least so I have found it. In securing new aids, this class responded above any on my list except the growers of thoroughbred hogs.

Another very fine type of reporters not mentioned, are the country doctors. Many of these men also own farms, or have at one time owned them. They are keen observers and travel extensively. Their reports are usually accurate, and when not too busy, they are reasonably prompt. From what I have noticed, I believe their reports are a trifle more optimistic than farmers'. Other types of men who have not been mentioned are agents of various kinds, - life, fire, farm machinery, stock, feed, etc. Some of these make very good reports.

Before finishing a discussion on types of reporters, we must mention the difference in returns from the different type of farmers. Some of this material was covered in the morning's talk on producers. The variability or difference in cost and reliability of different types of producers presents features worthy of remark. For instance, in building up a list of aids, it was found that breeders of blooded stock, especially hogs, returned the highest number of schedules per hundred on first solicitation (mail). The returns of common hog raisers were less than half that of the growers of thoroughbreds. Peach and apple growers responded readily, while truck raisers replied scarcely at all. The same was true of sheep raisers.

Starting with no list whatever or a very small or poor one, is quite a different matter from building up and strengthening a fairly good one. In the first instance an energetic and rapid canvass must be made at a relatively high cost. This may be done either in person or by mail. When merely strengthening a list assistance of those already reporting is of great help. Volunteers come of their own accord and old aids move into weak territory, so that if the field corps is strong in places, it tends to hold its own fairly well, and the cost of getting new correspondents is comparatively light. By mail, with the circular letters furnished, the weight of the Department back of the request, freedom from errors which we all must make sometimes, it is largely a question of plugging to get up a good mail list.

We have this advantage for the mail selected list, greater, almost unlimited choice, a plan that any industrious person can work out as opposed to that of genius, a cheaper and more dependable method, and one infinitely more rapid and certain. It is also free from the objection of building up a following which any successor would find almost worthless.

As a subsidiary or plan of perfecting and maintaining the list, personal selection on the other hand has some decided advantages. It may require only one man to round out a list and he may be picked up at no extra cost whatever as the agent goes about his regular monthly duties.

To summarize, our conclusion is that the method of getting and keeping the aids depends largely on the individuality of the agent, but that the written type is the easiest, cheapest and most reliable for the ordinary agent, both to get and keep.

A large list is of advantage where we wish to get minute information as to the acreage of truck and condition of special crops, as there are sure to be those among our reporters in each locality who are posted or who will get this information for us. Now that we have a Truck Specialist and Fruit Specialist this will not prove as important as formerly. Again, a heavy list prevents us from going far astray, as it will automatically offset any wild report which we fail to edit.

The geographical considerations are most important in deciding upon the size of the list to be carried. Each climatic region must be amply represented, or we shall be short on data on some crop important from a state standpoint. When the state is homogeneous like a prairie state, with comparatively similar climate, a relatively small list should answer. When, however, a state has several belts of very different climatic and crop zones, with two mountain zones, a plateau and two separate coastal zones, such as we find in Georgia, a larger list must be carried.

Where the agent is especially well posted on a certain section, he may reduce his list in that region; also, when he has the work fully in hand, he can get along with a much smaller list than when he is new to the work. Thus a new agent might need 600 or more when beginning the work, but be able to cut the number to one or two hundred when he gets a line on the minor crops, has eliminated the unreliable reporter, etc.

With a clerk or assistant, about which we have talked somewhat, we can carry a much larger list, get a closer and safer estimate on all crops, take care of our aids in better fashion and still have time to look after the important points in the field. Upon the number of aids, to a large extent, depends our proportion of the various types. With a very small list we must confine our aids to those able to report on the general run of crops or to farmers.

The farmers or producers have proven to be a good basis, making due allowance for their peculiarities. Buyers, handlers, merchants should be represented in order to offset farmers' errors and give us a good general average. Lastly, we should add as many accurate and comparatively unprejudiced observers as are needed to correct occupational and other bias. This we can obtain largely through the medium of rural carriers, doctors, agents, etc.

To make up a complete and accurate list, these conflicting plus or minus signs should be so blended as to balance. Or, if the average of all is found to incline always in one direction, the list should be kept as near as possible in the same proportions so that the figures used as the basis of normal will not have to be changed. To illustrate: If our basis of normal for cotton is 240 pounds per acre (with finely calculated variations for each month) and as we get more farmers and drop rural carriers, our list will report lower than previously, so that we shall have to raise our figures to make correct forecast.

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January 23, 1917.

LISTING REPORTERS FOR PUBLICATIONS.

BY
Verne H. Church.

During the year 1915, as an experiment, I distributed about 3,500 Farmers' and Department Bulletins to correspondents, and the apparent appreciation of this automatic service seemed to warrant its continuance and further development, so that the distribution for 1916 was increased to approximately 21,000 bulletins. Of this number, nearly three-fourths were publications of general interest to all field aids and were mailed at my request by the Division of Publications. While this arrangement relieved me of much labor in addressing envelopes and in mailing, and provided a far greater distribution than my time would have otherwise permitted, I am of the opinion that those mailed direct from my office received closer scrutiny by the correspondent, that he was more appreciative of the favor, and that he felt under a greater obligation to me than if he received them from the division of publications. The plan seems to add a personal touch to what otherwise would be merely an official relationship between field agent and correspondent.

The object of the arrangement is to provide each correspondent with the bulletins he may desire, as soon as they are issued and without action on his part. To accomplish this, a printed card containing a list of 20 subjects under which practically all bulletins can be classified is mailed to him with the request that he check the subjects in which he is interested and return the card. Space is also provided on the card for name, full address, exact location, and occupation of the reporter. The cards should be 3 X 5 inches, or other standard size, to facilitate filing for future reference and for use when addressing bulletins to any of the special lists.

Only a comparatively small amount of time has been devoted to this feature and I regret that my available time will not permit of a further extension. I consider it has done more to establish a feeling of confidence and friendship on the part of the correspondent than anything else I have done unless it be personal visitations to their respective homes, which up to this time have been very limited because of lack of time and funds. It demonstrates to him that the Bureau and the field agent are really desirous of being of special service to him, aside from and beyond the usual favors and courtesies he knows are extended to all.

As the bulletin service of the Department has come to be quite well understood by the rural population, I believe that this Bureau should redouble its efforts to obtain, for those voluntarily cooperating and assisting it, bulletins for which a nominal charge is ordinarily made, the Year Book, and other valuable favors. The field Agent is often confronted with the charge that the Bureau only offers for reporting services such favors as

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his less public-spirited neighbor can obtain by merely addressing a letter to the Department or to his congressman. In addition to the special valuable publications mentioned above, I would like to have every field agent supplied with a sufficient number of copies of some special book or periodical of still greater value to enable him to place a copy in the hands of every aid who has made 11 satisfactory reports on the general schedules during the year, or voluntarily furnished a valid excuse for the months he has failed to furnish estimates.

Special Classes of Reporters - Grange Members.

January 26, 1917.

BY

J. L. Cochran.

The Grange is a very strong organization in Ohio, there being about 750 active Granges in the State, with a total membership of about 63,000 members. These Granges are well distributed throughout the State, the Official Roster for 1916 showing a representation in 86 of the 88 counties, with 60 counties thoroughly organized. As the male membership of the Grange is composed, in a large measure, of progressive farmers, one can readily appreciate how valuable the full co-operation of the Ohio State Grange would be in this work.

Realizing this, an appointment was made with the State Master, in March of last year, which resulted in the Master giving full sanction to the following plan: That the Secretaries of the Subordinate Granges in territories at that time not thoroughly covered by Field Aids' reports be requested to serve as Field Aids for the sections covered by their respective Granges; that during the "discussion period" at the last meeting in each month, the Secretary obtain the opinions of the members present on the current inquiries of this Bureau, using the consensus of these opinions as a basis for his report on the regular schedule at the required time; that the Secretaries be furnished, in return, copies of the telegraphic Crop Report as distributed by the Weather Bureau office, and their names be placed on the list to receive the Monthly Crop Report and the Weekly News Letter, copies of which to be filed in the Grange meeting places for the use of all members.

The plan as proposed was submitted to the Chief of this Bureau and received his full approbation. Form letters outlining the plan and requesting their services as Aids were supplied for mailing out to the various Secretaries, and the State Master very kindly furnished a letter strongly recommending hearty co-operation of the Granges in the work, a copy of which was mailed out with each request. 22% (or 62 in number) of the Secretaries solicited took up the reporting work during the months of July and August, last, and up to and including the January Report of this year, their average faithfulness rating, based on number of schedules returned, is 72%, or 2% higher than the average rating of all Ohio Field Agent's Aids for the same period.

In several instances where the date of the Grange meeting falls too early in the month for the Secretary to follow the outlined plan and consult with the various members before submitting his report, the Secretaries have taken upon themselves the work of rendering the reports without the combined assistance of the other members.

The schedules returned, with the comments contained and the explanatory letters which frequently accompany them, indicated no small amount of care and painstaking efforts in their preparation. It is needless to state that these reports are given considerable weight by the Field Agent. The co-operation on the part of the State Master, the Secretaries, and the members of the Granges reporting has been all that could be desired. A feature of the work that should not be overlooked is that through this co-operation a part, at least, of a very strong association

is probably becoming more familiar with the methods of crop reporting, the scope and value of the Government Crop Reports. The Ohio Field Agent, himself a member of the Grange, intends taking advantage of every opportunity to meet with the members of the association and to acquaint them more thoroughly, if possible, with the workings of this Bureau.

One incident, only, has occurred to date that may possibly have a tendency to interfere somewhat with the carrying out in full of the original plan. The supplying of the Granges with copies of the telegraphic Crop Report brought up the question, on the part of the Chief of the Office of Information, of the advisability of departing from the present rigid rule of limiting to newspapers and County Agents of this Department the distribution of the data wired monthly to the Weather Bureau stations. Another conference of the Ohio Field Agent with the State Master has been suggested by the Chief of this Bureau, with the view of determining to what extent the distribution of this data to the Grange Secretaries is generally advantageous. Until such conference can be arranged, the matter is being held in abeyance, and undoubtedly will be eventually settled to the satisfaction of all parties concerned.

January 23, 1917.

COOPERATION WITH COUNTY DEMONSTRATION AGENTS.

By
H. F. Bryant.

Cooperation with the county demonstration agents seemed especially desirable in West Virginia because of their knowledge of local conditions. Estimating crop condition or production is complicated in West Virginia by the deceptive appearance of the country from the railroads by the very confusing variety of soil types, and by the unusual range of altitude of cultivated crops, within small areas.

The confusing mixture of soil types and the great range of altitude within such very narrow limits are likely to prove extremely deceptive. Even when the aids report it may happen that those reporting for that particular month all live on a certain type of soil, or within a certain zone of altitude, where conditions are entirely different from the bulk of the farming country in their counties. Naturally there is a very striking segregation of crops, so that error in estimating conditions in a relatively small area will mean error in the report on the whole state, as the bulk of every crop (except corn and hay) is produced within a certain group of counties. This is especially true of apples, peaches, wheat, tobacco and buckwheat.

After working in West Virginia for some time I had a verbal agreement with the Director of Extension, at the College of Agriculture, that we should cooperate in any way that seemed to promise mutual help. In exchange for information being furnished to me, it was agreed, I should furnish whatever information it seemed to me, or to the Director of Extension, would be useful to the farmers. This is sent to the Extension Department each month, written in concise, interesting news form. In this writing I found previous newspaper training of the greatest help. The farmer simply will not take an interest in long strings of figures, or in abstract facts. That is the psychological factor back of the whole extension and demonstration system. Then, from these summaries, which I write each month and send to the Director of Extension as soon as the report is approved in Washington, the extension workers take extracts for their news letters to the farmers and local papers throughout the State.

The Director of Extension left to me choice of the method by which the county agents should cooperate with me. The plan I adopted was that each county agricultural organization should appoint a committee, to be known as the crop reporting committee. The choice of the men who should serve on these committees was left absolutely in the hands of the county agents, the presidents of the farmers clubs or county organizations, or whoever were the chief officers.

The members of these committees are furnished reporters' slips each month by the field agent, but the return envelopes are addressed to the county demonstration agents, instead of to the field agent.

A schedule is furnished each county demonstration agent each month, with return envelope addressed to the field agent. The county agent looks over the individual reports of his committeemen, decides what the report for his county as a whole should be, and sends that report to the field agent.

The whole plan is simply an extension of the general system of this Bureau. Each county agent has his committeemen who report to him and then he reports to the field agent, just as the field agent sends to the Chief of this Bureau his state estimates based on his correspondents' reports.

The field agent should carefully avoid all appearance of trying to secure any real, or assumed, authority over the county demonstration agent. Do not try to enter any such plan unless the director of extension and the county agent are perfectly willing to cooperate with you. There are about thirty-two county

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agents in West Virginia; fifteen of them appointed these committees for cooperation. Some of the county agents resent this, as an attempt to force more work on them. Whatever you do, do not try to urge anyone into any such work. You may call on them, get information from them by interviews, but don't try to force them to cooperate with you, even if the Director of Extension has said they should.

Second: don't enter any such plan if the Director of Extension, or other official with whom you might choose to cooperate, shows an inclination to dictate and try to assume direction of your work.

Frequently the individual county agents write to me for information about agricultural production in their own counties, or in the State as a whole. I always help them in every possible way, whether they are the ones that are already cooperating with me or not. In several cases that has been the means of getting good committees appointed and of getting reports from those county agents.

If any other field agent has thought of trying any cooperative plan similar to this he may just as well recognize, in advance, that he will have disappointments, unless he is fortunate enough to have conditions¹ or farmers, or county agents, or a field agent, very different from those now working together in West Virginia.

January 23, 1917.

DRAG OF THE INEFFICIENT CROP REPORTER.

By
S. A. Jones.

The most elementary and least valuable form of crop report, is that showing simply that existing conditions are good, poor, or average, that is, better, worse, or equal to past experience. This form of report can be furnished by practically every person associated even remotely with the production or handling of crops, because it is within the knowledge of all such, either through personal observation or because they have absorbed it through the common talk of their associates. Crop reports increase in value as they become more definite in their comparisons.

Most, if not all, Field Agents have among their lists of reporters, men of all grades, from those who are close observers and whose reports reflect adequately the changing conditions, down to the absolutely incompetent man whose report may be an actual perversion of fact. To reflect accurately the changing facts, the average should be based upon reports from men all of whom are close and intelligent observers. Such an ideal list does not exist in the Bureau, at least. The average man is not a very close observer, and while conscious of the trend finds it difficult to gauge the full extent of changes in conditions or acreages. If in doubt he is naturally conservative and plays trumps by inclining toward the usual. If it be assumed that out of 100 reporters on a list, 20 are close observers, 70 average good observers appreciating the magnitude of variations up to perhaps $\frac{4}{5}$ to $\frac{7}{8}$ of their actual extent, and 10 indifferent, having little appreciation of deviations from the usual, we might expect from their reports an average that would reflect approximately the true situation only if it were average, but only about $\frac{5}{6}$ of the deviation from the usual in case it were not average. In other words, if the actual situation should justify a figure of 100 per cent compared with a usual of 70, the reports from such a list, instead of indicating the full departure of 30 points from the usual, would show probably not to exceed 25 points departure. That is to say, the excellent observers would report 100 per cent, the 70 average good observers would report it at about 95, and the 10 per cent of poor observers at probably not to exceed 80 or 85, giving an average figure of about 95, instead of 100.

In case the facts were under average, the results would be reversed, but the error of lesser degree, because deterioration can be more readily observed and the degree of deterioration more accurately gauged than excellence and the degree of excellence, especially when the degree of excellence becomes superlative. It is easier to go down than up, to fall than to climb. Conversely, when the true figure goes above 100, which to many is the maximum limit of expression in percentage, the proportion of reporters capable of appreciating the full extent of deviation rapidly declines, with a consequent progressive broadening of the error in the average.

Where accurate checks are available, it is found the underestimates customarily occur with the big crops and overestimates with the small crops. Allowance must be made for this tendency. Accurate measurement of its extent and variation seems difficult and its elimination, as a natural human tendency, impossible. But meantime, the positively inefficient reporter has the effect of undue friction in interfering with the free movement of the average, preventing it

from expressing in fair degree the amplitude of the actual change in the conditions. He is thus an encumbrance, a dead weight dragging at the ankle of our personified average, who at the best is somewhat halting in gait. To the extent that he is tolerated, the inefficient reporter overcomes the increase in accuracy of an average that is to be expected from an increasing number of reporters. A moderate number of careful observers may for this reason furnish a more accurate average than will a very large number that includes any considerable percentage of careless observers. The elimination of the latter is desirable, and will repay some effort. This effort can probably most profitably be made through observing and making a record from month to month of reports and reporters that appear to be out of line with the facts as reported by their neighbors, observed by the Agent, or considered probable on the basis of other information, as weather, etc. Look out for the man who habitually reports with the same figure for all crops, or widely divergent figures for crops that are similarly affected by the same conditions and should be expected to give figures close together.

Travel
by
F. S. Pinney.

The time spent by Field Agents in the office during the growing season should be cut to the minimum. It is not so important just how far an Agent has traveled during a given time but how he has traveled. Was he alert? Was he "on the job?" Did he observe and profit from what he saw and heard? Does he have the all important faculty of judging for himself the important features bearing directly on his work? Is he continually striving to comprehend and assimilate only that which is to be of assistance to him in arriving at a conclusion, based upon logical reasoning?

For years I have followed the practice of closely observing men who get on the train, not only in the car I am in, but all passenger cars. By so doing a field man is thus enabled to meet many well-informed farmers. I generally approach them with the question, - Do you live at the station at which you got on? - and upon learning where they live, if it is in my territory I make inquiry as to the price of land in their vicinity; what the tendency is with reference to carrying on rotation of crops; whether the acreage from year to year tends to change; if the tendency in their locality is toward a general improvement in farming; what the crops yield on the average, and by so doing I generally succeed in gaining valuable information before their suspicions are aroused. Information obtained in this manner, in my opinion, is less subject to bias.

Relative to routing to avoid loss of time, I have but little to say upon this element of travel other than that it is well for a field man to have some practical system in covering his territory. Iowa is one great agricultural territory and the occasion to seek the shortest distance between two points seldom arises. In my territory, should I take the longest distance between two points it would generally be for the good of the service, particularly in the daytime, as it would increase my purview of the crops. However, under a well laid-out plan, much more can be accomplished in travel, thus eliminating unnecessary delay, which is both expensive to our Bureau and retarding in its effect upon our work.

As to the element of travel, under the heading of Division (C); Permanent versus variable routing, I have long since come to the conclusion that it is far better for a field man to map out a well defined course of travel, which will increase to the greatest extent the amount of territory possible to see, in the time which his work will permit him to travel. There is no question but that a man traveling over his State, in a systematic manner, covering the same territory at regular intervals, is better able to detect important changes than the man adhering to variable routing. There are frequently times when an adherence to the regular travel is not practical. The planting period of corn commencing, as it does, about May 1 in the southern counties of Iowa, and extending as late as May 15 in the northern counties, disastrous elements, etc., often make a diversion from permanent routing imperative. Permanent routing, if so arranged to give the observer the best general average of all the districts of his State, has the wonderful advantage of enabling him to locate considerable stretches of territory in each section, which in his opinion covers a general average of the entire section. This can not be accomplished by a Field Agent who is attempting to enter every nook

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Through the use of the telephone I contend that there is a psychological condition created, a power, or a force, which the letter seldom ever accomplishes. The use of the telephone has the advantage of getting at your man directly. He knows you are spending money when you are talking from another town, that you expect him to be to the point in his answers, and that he is of some importance in your opinion or you would not be calling him. Many correspondents are not used to receiving long distance calls and they take it as a compliment to them. It has the effect of creating a renewed interest in the work.

TRAINS - PASSENGER - MIXED, FREIGHT, COACHES
VERSUS PULLMAN.

January 24, 1917.

BY
H. O. Herbrandson.
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In broaching the subject of train travel, it seems well that I should state first of all that the Pullman need be given but slight consideration, in South Dakota, at least. There are but one or two lines of Pullman cars operated during day-light hours and these I seldom have occasion to use, except when an individual whom I wish to interview is riding there.

The coaches, especially the rear vestibule coaches during months when crop conditions are being observed, are the most desirable places while passing through territory to observe relative conditions of all crops. At such times I make special effort to utilize daylight hours for travel if possible. I often have found that good information can be brought out or secured from individuals in coaches or smoking compartments.

In speaking of crops in South Dakota I mean corn, wheat, oats, barley and flax, whose relative importance are in the order given. These crops when making a normal growth give a healthy green appearance. When such diseases as rust strike the crop the effect on the general color is such as to make itself evident at once to an observer - although the Pullman observation is often scoffed at. I find rust easily distinguishable and the seasons of 1914 and 1916 gave splendid opportunity to try this method out. Of course this method of examination or observation must be substantiated with more careful and thorough observation on foot or otherwise in the fields, but to make a quick survey of a large area the trains help very much in drawing conclusions. This was necessary in 1916.

From trains also I find it easy to detect damage from hail and in South Dakota the effects of early frost, especially on corn in 1914 and 1915, were quite evident. This method is also of value in drawing conclusions on the extent of grain unharvested due to diseases, as in the season of 1916.

No system for noting conditions along the railways seems especially to commend itself to me. All systems either become too complex, as trying to reckon comparative acreage in counting telegraph poles or to compute field distances in that way. The comparative condition as set down for previous trips of inspection is about the only thing I have been able to do. At the time of plowing, sowing, reaping, harvesting and thrashing a somewhat reliable check may be gotten on the number of fields in which work is in progress or has been completed.

For me the mixed train and freight fit in nicely at times. At the way station these trains usually stop sufficient time to permit short excursion into the fields for examination or time for brief interviews with grain men. All elevator men are interested in the field agents work and usually have valuable information to offer.

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On occasions when in search of information with reference to live stock, or special acreage data these slow moving conveyances are much less servicable because at such times it becomes necessary to spend more time at each stopping place. Bankers, real estate men, or the county officials, are then called on for information and more time is required than the freight stop would permit.

There are a few routes in South Dakota which can be covered advantageously by what may be called "doubling" on trains, that is, going beyond the destination to more distant point which I wish to visit, and after securing the information desired there, returning by later train to the previous place where I wish to stop. This practice is specially desirable in territory similar to South Dakota and other Western States where train service is much less frequent than in more densely populated sections.

CONVEYANCE
(INTERURBAN)

January 24, 1917.

BY
G. C. Bryant.
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On January 1, 1900, the first interurban car in the state of Indiana was run between Indianapolis and Greenwood. This line was 11 miles long and the only one in the state. On June 17, 1900, the second line was completed and cars were run between Indianapolis and Richmond, a distance of 65 miles. Now there are more than 350 passenger cars leaving Indianapolis daily on the lines of four companies with approximately 1400 miles of track. There are also nearly 700 miles of track in the state that do not connect with the lines entering Indianapolis. At the present time there are a little more than 2,000 miles of track in the state with about 60 per cent of it operated and controlled by two companies. The other 40 per cent, being operated by eight or nine separate companies, but all of them co-operating wherever their lines come in contact. A great deal more than one-half of the population of the state is served by these roads. Small depots or stops are located along their lines approximately a mile and one-half apart and a car passes every hour or two. The cars are fairly comfortable, being about sixty feet in length and divided into three compartments, a general passenger compartment, a smoking room and a compartment for baggage and express. The fare is usually the same as that charged by the steam roads, and the other accommodations, such as checking baggage, location of depots in cities, etc., are about equal to those of the steam roads. Travel on these cars as compared with the steam roads is not as comfortable for the passenger, but there are some features about it that make it somewhat more desirable, especially for short rides. There is no smoke to suck in through the windows and no cinders to lodge in your eyes; the running schedule is not very fast, especially on local trains, and the chance for observation is much greater than from any other method of conveyance. Many farmers use these cars in preference to other means of travel and this gives the field agent plenty of opportunity for interviews with men direct from the fields. As mentioned above, the service is quite frequent and affords opportunity to visit many towns or other places in a day's time. About the only unsatisfactory thing connected with them is the fact that in nearly every instance the electric roads parallel the steam roads, thereby creating no new territory to be investigated.

Since the inauguration of interurban roads in Indiana, the passenger traffic has increased, in Indianapolis alone, about 1800 per cent. In 1900 there were less than 400,000 passengers handled in and out of Indianapolis, while in 1916 there were over 7,000,000. The interurban mileage in the state has increased approximately 2500 per cent in the same period.

January 24, 1917.

CONVEYANCE BY STAGE.

By

A. D. Cook.

The growing use of the automobile for replacing the old stage coach is rapidly shortening the time required for making the stage trips still necessary, and also adds much to the comfort of that class of travel. The lack of good roads in some sections puts the automobile at a disadvantage, particularly in bad weather. And transportation by team over the longer stage lines is very slow as a method of transporting goods, and expensive, and in case of bad weather is a very unpleasant mode of traveling.

In good weather, staging is a delightful form of making the territory, as the country can be learned much better from a stage than from a railroad train, and the open air form of travel, is always enjoyable. As a matter in point, in making the village of Kirtly by stage from Lusk, Wyoming, we were obliged to leave the road, on account of a washout, and drive through a newly planted field of wheat. I made the trip later on when the wheat had grown up, and noticed particularly the increased or rather stronger, thicker, and higher growth where the wagon had gone through the field. These matters are of interest in that section which is in the arid belt, and where so much discussion has been had concerning methods of farming that character of lands.

As far as transportation of goods and property is concerned, the stage is slow, and an expensive form of transportation, particularly when the slowness is aggravated by poor roads and wet weather. I am referring of course to the horse drawn stage in this case, as in cases where good roads have made the automobile available, time is shortened and quantities of goods can be hauled both to the railroad to be shipped and goods bought can be taken back. Farmers living near the railroad naturally do their own hauling, and are not dependent on stage transportation, but the expense of hauling to them is the same although it does not show up in such manner that they take notice of it in the way they do if they have to have the hauling paid for in money. Whatever shortens the time and increases the load for the stage will have the same good effect for the farmer himself who hauls over the same road.

The extensions of the railroad shortens the long stage lines, and in the increase of population that follows the railroad, that is looking for land in the west, is also looking for better roads, and improvements on roads of a permanent nature which will take away from such stage lines as will still remain, much of the unpleasantness that has connected with them in the past, and make a pleasure of traveling in sections off the railroad.

January 24, 1917,

CONVEYANCE - HORSE.

By

H. F. Bryant.

600

Horseback travel suits me in West Virginia orchard districts very often, first because I like it, and second because frequently it is the only way I can get there and do the work satisfactorily. The principal trouble is getting horses.

Most of the large peach orchards and many of the large apple orchards in West Virginia are high up on the mountains or ridges of chert or slate land. To many of them there is no good road. Furthermore if you hire an automobile the cost is too great. This may be occasionally, and I sometimes use it when roads permit, but for climbing about over mountain ridges and getting through orchards sometimes several miles long, especially on the stony land where it is like walking over a rock pile, I prefer a horse to do the leg work. Automobiles can not go through the orchards and walking is out of the question.

Any examinations of trees, fruit buds, fruit or cultivation may be made from horseback almost as well as on foot.

Although there are usually better roads in the districts where annual tilled crops are raised and automobiles are generally satisfactory, yet even there horseback travel is sometimes best for riding around fields and over farms. The automobile has the advantage for covering large areas rapidly, if roads are good, but for short trips the horse suits me, because he is convenient, cheap, and I like to ride.

January 24, 1917.

TRAVEL - ON FOOT.

BY

W. F. Callander.

There are times, I believe, when the field agent can with advantage and at a considerable saving of expense, make short trips of inspection on foot. On a walking trip one is not confined to fields along the road but is able to strike out across the country and in so doing will meet men working in the fields whom it would not be possible, or at least convenient to interview, if the trip was being made by automobile or otherwise. But unless conditions are right and there is plenty of time at one's disposal, I would not advocate using "snank's mare" as a mode of conveyance. Under certain conditions, however, for example, where the type of soil is quite uniform throughout an area and the character of the crops grown is the same, I have found a short trip on foot across country often more satisfactory than a trip by automobile or horse, as the territory covered in this way will be typical of the larger area with identical soil and crop conditions. Where, however, the soil types are not uniform and the character of the crops grown is diverse, or where one is looking for an outbreak of some disease or crop pest, the inspection of the limited area which it is possible to cover on foot within a short time is not a safe procedure, since the sample, so to speak, which is taken is not large enough to be truly representative of the larger area.

Quite frequently when I came to small country towns or villages closely surrounded by farms, where I am compelled to remain much longer than I should prefer because of limited train service, I strike out across the country for a two, three, four, or five mile walk--one afternoon I walked twenty miles. If the trip is planned so that one can return along a well traveled road, one is almost sure to pick up a ride back to town if one does not care to walk.

When the time comes that the field agents can be furnished with machines, I do not expect to do nearly so much walking as I do at the present time since it will be possible to leave the machine at any point at the side of the road and spend as much time as I wish in the fields without being compelled to pay livery hire during the time spent on inspection. This is one of the troubles at the present time. Automobiles are hired by the mile or by the hour. If paid for by the mile the driver does not like to be delayed for any length of time at any particular place, and if the machine is being paid for by the hour, one cannot afford to keep it idle while making extensive field inspections.

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January 24, 1917.

CONVEYANCE - AUTOMOBILE.

By

J. L. Cochran.

I shall review briefly travel by auto during the past year. From April 1st, until October 30, 39 per cent (or 3845 miles) of all official travel done within the State was by auto, and practically all of this was done by privately owned conveyances.

During the month of April, blocks of territory containing representative farms in three of the principal wheat producing districts of the State were selected, and what was practically a farm to farm canvass within these blocks resulted in a concrete figure in the percentage of wheat acreage abandonment. At this time, fields of wheat in representative farms were selected which were personally observed from month to month and followed up until the final yields per acre were determined. Other crops were handled in the same manner, actual figures on acreage were ascertained, condition was noted at regular intervals, and final yields were determined.

The auto can be used to an especial advantage in thoroughly covering limited areas within which the production of certain crops is practically confined. A large percentage of Ohio buckwheat is produced in a few counties in the north-eastern part of the State. During the buckwheat acreage investigation, last season, but two days were spent in this territory, during which time 289 miles were traveled, many actual figures on acreage were obtained, and practically all dealers in this particular crop were called upon.

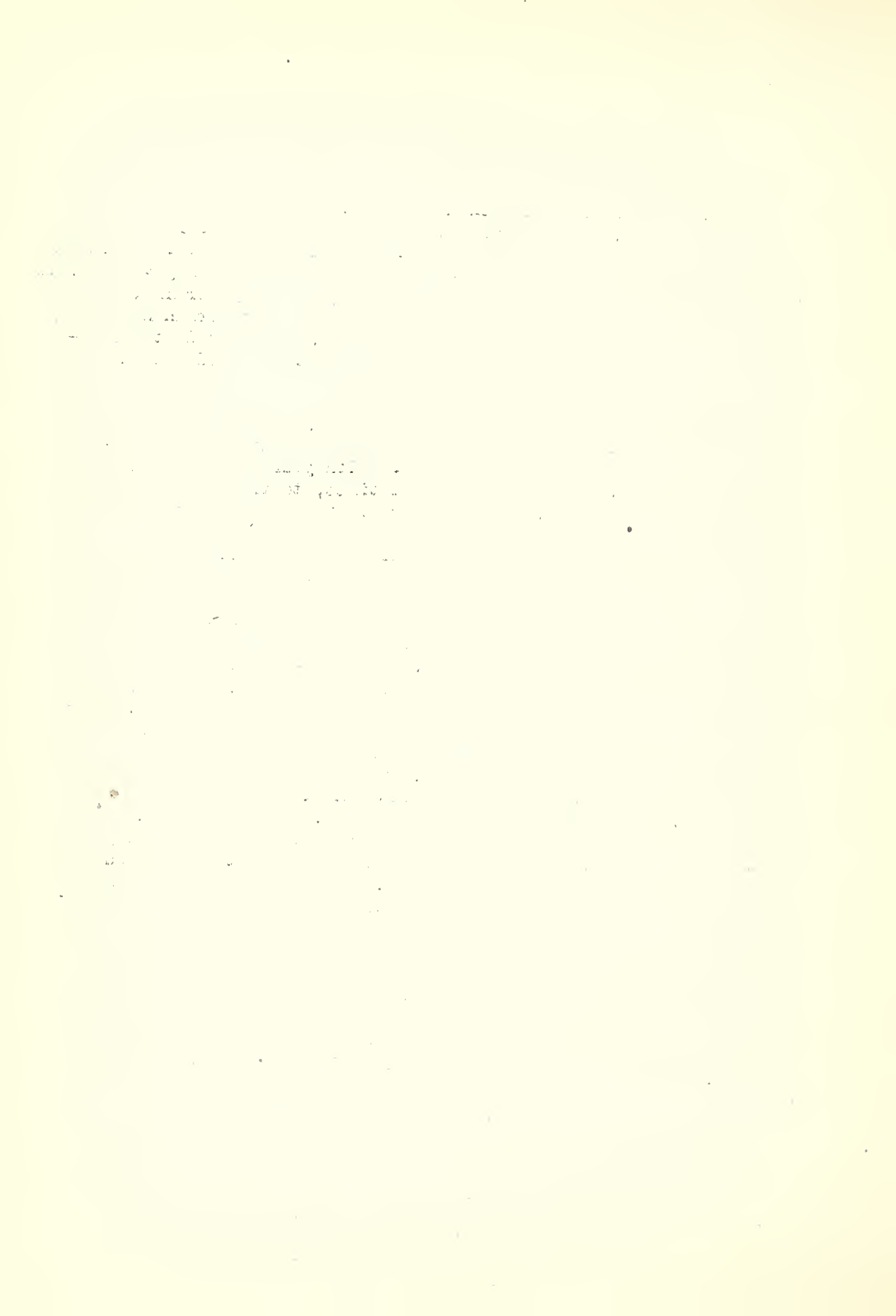
On August 11th, accompanied by our Tobacco Crop Specialist, the Ohio Section Director of the Weather Bureau, and one of our prominent tobacco dealers of Dayton, we traveled 148 miles through the heart of the Miami Valley tobacco district, and personally observed 260 fields of tobacco. Stops were frequently made and a number of fields were carefully inspected. At the close of the day's work, we had an average condition figure that was entirely satisfactory and in which we had the utmost confidence. The following day, we traveled 98 miles, observed 200 fields of tobacco, and at the close of the day's work and the trip, we felt that our personal observation and inspection had given us a first-hand knowledge of the Miami Valley crop that could have been obtained in no other way within the same length of time.

The use of an auto often gives an opportunity of taking with us on our trips State and county officials, and officers of various Grain Dealers' and Millers' Associations - gentlemen who are always only too ready to render to us every assistance within their power. On a three day's trip, last May, during which 230 miles were traveled, the Secretary of the Ohio State Millers' Association, was thus enabled to call upon nearly thirty members of his Association.

The use of an automobile makes readily accessible the locations of our rural correspondents, other men whose services as aids we are especially desirous of obtaining, and the correspondents and other well informed men who reside in small towns, where the railway facilities for getting in and out are not the best. Just the required amount of time may be spent in a place, and interviews are not subject to being abruptly terminated by the sudden discovery that time for the departure of one's train has nearly arrived. When using an automobile, the time of one's arrival at and departure from a given place can be regulated to meet the needs of the occasion.

From experience in the use of both classes, from the standpoint of satisfactory service we recommend the use of the privately owned conveyance over that of the hired automobile. With your own car, you have it instantly available for service at all times, to travel in any direction, over any roads, at any speed desired. You know that the car is in good condition when you start, and can reasonably expect to arrive at the destination selected. You know the seating capacity of your car, and can plan to take with you whomsoever you may wish. You know the distance you can thoroughly cover in a day's time and can arrange your schedule accordingly. If full re-imbursement were made, we should unhesitatingly recommend the use of a privately owned automobile in the work of gathering crop data. The present regulations, of which this is in no sense intended as a criticism, are practically prohibitive to the use of a privately owned car in official travel. During the nine months ending December 31st, last, a careful record was kept of the cost of operation and maintenance of our car. The car referred to is a six-cylinder, five passenger touring car of a popular make. To include December 31st, the car had been run a total of 6,724 miles, and the cost of operation which includes cost of gasoline, oil, and grease, tire cost based on actual usage which shows that a new tire has been required for every 1,043 miles of travel, the tire repairs, minor repairs to car (which include the burning out of carbon, etc.), and washing of car, has been 5.44¢ per mile. The cost of maintenance (used here in the sense of cost of owning the car), which includes the interest at 6 per cent on the money invested, the State auto license of \$5.00 per year, the garage rental and storage charges, and the estimated depreciation in value of the car (based on the opinions and estimates of a number of dealers in the State, and being the average yearly depreciation for a period of three years, so as not to throw the burden of the heaviest depreciation upon the first year's usage), has been 4.39¢ per mile. The cost, per mile, of operating the car, 5.44¢ plus the cost, per mile, of owning the car, 4.39¢, gives a total cost per mile of owning and operating the car of 9.83¢.

During the season the car was used in official travel for 3,684 miles, for which a re-imbursement was received of 2.63¢ per mile. As the actual cost of operating the car was 5.44¢ per mile, a simple calculation shows that an actual loss of \$103.52 was incurred in operating expense alone; and if to the cost of operation there be added the cost of owning the car, we find that an actual loss of \$265.25 was suffered, due to the use of a privately owned automobile in official travel during the season.



January 24, 1917.

Field Methods.

By

S. D. Fessenden.

Names---The object of the field work is, as we all know, to obtain necessary information along the lines of the regular and special reports made by the Bureau. In order to do this it is necessary--first; that the agent inform himself as well as possible through travel and personal observation and--second; that he have personal interviews with representative men from all classes of those whose business is connected with agriculture. There are many of these classes such as the cultivators of the soil, live stock producers, grain and produce dealers, agents of transportation companies, managers of grain elevators, flour millers, manufacturers of cereal products, editors of agricultural newspapers, officials of agricultural colleges and experiment stations, county agents, etc. As far as condition of the growing crops is concerned it is my experience that the college men and the county agents are usually not well informed and are unsafe guides to follow. This I lay to the fact that these men are always at work on some one line or a few lines of special endeavor and do not therefore observe critically and with clear judgment the general conditions of agricultural affairs. There are printed lists of one kind or another to be obtained in every State giving the membership of agricultural and horticultural societies, of farmers societies like the Grange, of the directors and members of farmers institutes, of associations of flour millers and grain dealers, managers of farmers elevator associations, etc. Also city and town directories when existing give names of those engaged in all lines of business connected with agriculture and frequently will designate occupations of others such as farmers. Once you are in a town a prominent grain dealer or miller, easily found on inquiry, will give you the names not only of other grain dealers or millers but also names of prominent and intelligent farmers in the territory near by.

Approach---It seems to me that there is but little to be said in regard to approaching the men who are to be interviewed that is not known to all of you. The interview i.e., should be regarded primarily as a mere matter of business between men. The agent knows what information he seeks and should ask for it in a simple plain and direct manner. He should approach the man to be interviewed as a fellow man and a gentleman. He should bear himself with dignity, as men should do under all circumstances, but should make no assumption of superiority, either direct or to be implied by his bearing, either on his own account or because of his official position. Nothing is more apt to be resented by a busy man than an undue emphasis apparently placed by the agent on his official position. The presentation of the official card is enough in most cases to establish your status in the mind of the man you are interviewing and to acquaint him with your reason for calling on him. If not, a short and simple statement of what you are and what you want will be sufficient.

Extent of interview---The interview should as a rule be as short as is consistent with exhausting the source of information. It may be longer of course if the man being interviewed shows a desire to extend the talk. Time is of value to the business man and often also to the farmer and while he may be perfectly courteous he will be keenly sensible of your waste

of time and in consequence but little desirous of seeing you at your next visit.

Record of Statements---As to the recording of the statements made you I have found it much better to make no records or at any rate not many while with the man being interviewed. The more informal you make the talk the more you make it like his ordinary experience with any business man who may call to see him, and the more you keep him at his ease, the more likely you are to get at his real belief, his actual knowledge of the subject under discussion. I have no difficulty as a rule in keeping in my mind such actual figures as are given me by any one to whom I am talking until I have left him when I proceed to set them down before seeing another man. Of course there may be, and often are times when so many things are talked of and the interview is so long that it becomes necessary to jot down some of the figures or facts stated in his presence. Even then I find it works better to avoid the formal appearance of holding a note book in my hand and more or less impressively placing therein what I have been told.

Parting---When an agent has finished and starts to leave, it becomes again merely a question of taking your leave in a polite and gentlemanly way. I can think of no definite rule to lay down here. If the interview is the first had with the particular man, I think it well in parting to speak of future calls as being probable- the reply you get will usually give the agent a good idea of the impression he has made. Also if he has been interested, the expectation of your calling again may tend to make him more careful and accurate in obtaining information and in formulating it in his mind than he has been when he was doing this for his own use only. A word at parting of appreciation and thanks for a courteous reception and for the information obtained is always in order.

Return favors-Crop data and other service---Many of the men the agent sees are interested in special lines of agriculture and seize the opportunity of the agents visit to ask for information along the line of their special interest. As such information so sought has no direct bearing on the report the agent is working on, it can with perfect propriety be given by him. The agent can usually supply it from publications of the several Federal Departments and should endeavor to do so or to advise the questioner as to the sources from which he can probably obtain the desired information. In addition to furnishing all publications desired including the published crop data there are frequently small personal favors asked that may be considered as "return favors". As an example, you may have stated incidentally that you are about to go through a certain part of your territory, and you will be asked if you visit a certain town therein, will you carry such and such a verbal message to a certain person there. Such favors as this can well be granted and do much to establish friendly relations with both men.

I have spoken before of the desirability of making the interview rather of the informal order and will say here that the best results are usually obtained by me by making it assume the manner of a discussion of the situation. For the agent to merely put questions and receive answers

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is usually more or less unsatisfactory. If the agent is to get exactly what is in the mind of the man, he is interviewing, he must bring about an apparently free discussion. To do this it is essential that he make some comments himself, but he should as we all know be careful that he makes no definite statements as to the elements of the matter being investigated. He can it seems to make comments which are general in their nature and which refer to facts well known and accepted, of which perhaps the papers may be full at the time and are known to every one who reads.

Examination of Crops in the Field,
by
A. J. Surratt

The outstanding factors that appeal to my judgment as being the most important in the examination of crops in the field may be stated in a general way as follows:

1. Soil condition and preparation of seed bed.
2. General appearance and comparison of plant development with the Field Agents conception of normal for any given plant life.
3. Special damage factors.
4. Examination of representative territory.

In speaking of field examination or inspection I assume, of course, that all Field Agents carry on their personal investigations practically the same as myself; that is, usually traveling by auto, with numerous trips on foot, into fields adjacent to the road.

In the reference to soil conditions as a factor, I have in mind the examination of the moisture content of the soils in the various sections, the different kinds of soils and a general knowledge of the tendency of crop possibilities under different climatic conditions for these soils.

Indicated preparation of seed bed is a factor in my State because the majority of farmers are farming 320 or more acres.

If both the fall and spring seasons are limited, due to the length of the winter, it is not uncommon to seed grain, and especially wheat, without plowing the land. This method is called stubbling in the grain. For some seasons the amount of grain stubbled in will be at least 10 per cent, or possibly more. This method is much to be deplored as a rule but occasionally it outyields scientific seed bed preparation. More often, however, it is either totally or almost a failure. Thus it is necessary to know about the extent of such seeded area in order to balance the field agents judgment in regard to probable production in these years.

The second factor is the general appearance and comparison of plant development with the Field Agents conception of normal at any given period of the plant life.

The Field Agent through his long association and experience with the crops of his native section of the United States, if he has not already, will soon acquire a sensitive crop eye that will tell him almost instantly as soon as he sees a field in crop whether it has a normal appearance or not. He may notice that something is wrong with the vigor, color or health of a crop, the same as a physician with his patient, but it requires a diagnosis as a rule to discover the probable danger of the ailment.

A grain plant like all other crops must pass through certain critical periods in its development, when, if climatic conditions are not practically normal will decidedly change the yield possibility in a few days. These are the period when the Field Agent should be in the field as much as possible in order to determine to what extent the probable production will be influenced by the different factors existing at that time.

The important periods of spring wheat are the stooling and filling period. The stooling period determines the thickness of the stand. If too dry or hot and unfavorable for wheat to stool, the Field Agent must begin to base his estimates of yield on a main stem crop. He usually has a large number of records of main stem crops in North Dakota from which to make comparisons.

The filling period determines the size and quite frequently the quality of the grain kernels. This period is no doubt watched the most of any period by the commercial trade. It is of utmost importance to the Field Agent to follow closely the development of this period. At this time when the plant food changes largely to filling the heads of grain instead of to plant growth, it materially weakens the resistance of the plant to disease.

Under the heading of "Damage Factors," I had in mind disease, climatic, insect and weed damage, which in a general way are self-explanatory. I have given damage factors a separate heading because with the exception of weeds the Field Agent must practically give these factors separate, or at least special, consideration. The character of damage is often sporadic and frequently only affects limited areas. Estimating this damage involves an estimate of the extent of the damaged area and to what extent the area itself is damaged. Damage factors vary greatly from year to year and seldom or never repeat themselves in extent of area. Damage factors have no doubt caused and will continue to cause more sleepless nights for Field Agents than any other feature of their work.

In mentioning weeds as a damage factor, I was thinking chiefly of wild oats. The extent of foul seed growth at present in my State must be given consideration. It is frequently mentioned by my aids, both written and verbal, when working on yield or production estimates.

The last factor to be mentioned is under the heading "Examination of Representative Territory." I believe if the Field Agents examination of fields is to be of the utmost value to him in drawing logical conclusions covering the various crops that his travel should be rather scattered and general enough in range to permit him to determine as definitely as possible the average or representative condition of the unit in which he is working.

Observation from Cars.
Points to Note
and
Methods of Striking Averages.
by
J. J. Darg.

The information gained from observation from a railroad train is thought by some people to be of little value, as railroads generally run through poor sections of country; this may be so in some parts of the country but it is not always the case. Observation from an automobile is an entirely different thing, you can go into every nook and corner of the country you are traveling through and make what investigation you deem necessary; this you cannot do on a railroad train.

Observation on the condition of crops as seen from a railroad train may mislead you if you do not get into the interior of the country and make further personal investigation and also get from sources in the locality you are visiting opinions on the condition of the crops, other than your own opinion. You may get a very poor opinion on the condition of a crop as seen from a railroad train; you may see a small field of corn that you class as poor and note down a condition of 75 per cent to represent it, but on getting farther into the interior of the country you find upon closer personal investigation that the corn crop is excellent and you place the condition at 90 per cent, while from other sources in the same locality you get a percentage of 85 per cent and you must admit that other people know something about condition as well as yourself, so you take the average of your own figure and of that received from other sources and you get a condition of 88 per cent, but there is another thing to be considered and that is the acreage of the different fields - were you simply to take the condition of the small field, 75 per cent, and add to it the condition of the large field, 88 per cent, and divide by 2, you would get the straight average 82 as being representative of the condition of corn for that locality, the poor field being practically in the same neighborhood. This would not be representative of the condition of corn in that locality - the first field say contained 10 acres, this multiplied by its condition, 75, gives you 750; the second field contained say 40 acres, this multiplied by its condition, 88, gives you 3,520, and the two extensions added together give you 4,270, divided by the total acreage gives 85 as the percentage to be placed on memorandum book A. S. 3122, instead of 82, the straight average. Were the acreages of the different fields the same the conditions, although widely apart, were they added together and divided by the number of reports obtained, would give you the straight average, which would be the same were you multiplying each field by its own condition, adding the extensions and dividing by the total acreages; the straight and weighted average would be the same; it would be the same were the percentages of condition the same and the acreages widely apart.

Condition of crops can only be correctly obtained by close observation (over much territory) and the exercise of good judgment in watching weather conditions, etc. We get the straight average from the addition of

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the figures taken from the schedules sent in by the aids and dividing them by the number of reports received; they are then transferred from the pink slips on which they have been placed to the tabulation sheets and given the weight they are entitled to and worked out according to instructions from the Chief of the Bureau, which I am sure you all carry out.

A C R E A G E .

By

January 24, 1917.

W. L. Pryor.

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The quantity of a crop produced during any year is dependent upon the acreage planted, the stand obtained, the amount of fertilizers used, climatic conditions, and insect activity. Each factor named plays an important part in the total yield obtained for any year, and must be understood and considered, separately and collectively, by one attempting successfully to estimate crop production.

Normally acreage exerts the far greater influence on total production, and is, therefore, of prime importance as a true basis for all crop estimates. It is the fundamental principle in the whole equation. If to begin with, the acreage used is erroneous, then all estimates based on that acreage necessarily must be misleading. Yet, to maintain accurate estimates of acreage on the many different crops produced in the United States from year to year is the most difficult problem which confronts the Field Agents of the Bureau of Crop Estimates. Certainly it is a problem which requires skill and experience.

The stands and conditions of the different crops may be ascertained by passing through a few fields at regular intervals, or estimated fairly accurately from a moving train or automobile. We may safely assume that conditions responsible for certain stands and conditions in any one section extend to all growing crops in that community; the quantity of fertilizers used may be obtained from the records of tags sold in the different states; and even the weather can be studied from data supplied by the Weather Bureau. Not so with acreage. A number of things, both speculative and psychological, influence the farmer in determining the acreage to be planted to his several crops in any one year. These influences must be understood, and must enter into the calculations of any one attempting to estimate the acreage of the different crops early in the season.

Normally a good farmer plants all the crop he thinks he can work or obtain labor to cultivate. He may confine his activities to one crop, or he may place his "eggs" in several "baskets". Much depends upon the section in which he is farming. In a number of the states, the land seems equally well adapted to any one of several crops, while in others some one special crop has been found to be the most profitable. In a state where more than one crop can be grown with the same degree of success, there are more likely to be radical changes in acreage from year to year than in another state where the soil is specially adapted to growing a single crop. If a farmer's land will grow corn and wheat equally well, he is likely to plant largely to wheat should wheat be high priced and corn cheap. Likewise with land which will produce either rice or sugar cane. High priced rice and cheap sugar would have a tendency to increase the rice and decrease the acreage planted to sugar cane. But in a state like the greater portion of Texas, for example, which seems specially adapted to and produces cotton more profitably than any other crop, the larger part of the land will be planted to cotton regardless of whether the price is

high or low. The same situation occurs in several of the wheat states and perhaps in others producing certain crops. Hence it is much harder to keep a line on the acreage in some states than in others.

With improved methods of cultivation, the freeing of new lands of stumps, the substitution of wire for rail fences, tilling low lands and terracing hillsides, the small natural increase in rural population, and a constant broadening of the demand for all agricultural products, there should be a small but gradual increase in the acreage planted to all crops annually. However, a great many different influences enter into the question of acreage, which fluctuates almost as violently at times as do prices on the stock exchange. It is these things that the Field Agent must watch most carefully. He must familiarize himself thoroughly with all the different influences upon acreage in his endeavor to keep in line with the changes which occur from season to season.

A farmer may change the acreage planted to his different crops from year to year. An intelligent farmer in states where one of several crops is about as profitable as another will probably rotate his crops, planting corn one year, wheat another and clover the third, or he may allow his land to lie fallow one season in three or four in an endeavor to improve the soil. This rule, however, is not an iron-clad one. High prices prevailing for some particular crop, or other reasons, may induce him to change his scheme of rotation, and always without notice to the Field Agent who reports upon the crops in that territory.

The seasons are a large contributing factor in determining acreage. Weather conditions, especially rain or drought in the fall and spring, must be carefully watched. The weather in the fall, during wheat sowing time, in the winter wheat belt, may be such that a full acreage cannot be planted to wheat no matter what the intentions of the farmers are. It might be too dry to germinate the seeds or too wet to plow. Then the crop might be winter-killed, or so badly damaged that unless prices for wheat in the spring are exceptionally high it would not pay to let the crop go on to maturity. If in the spring, cotton, oats or corn, for example, were high-priced and wheat cheap, poor stands of wheat would be plowed up and planted to one or the other of these crops. The weather in the spring may be so bad that it is impossible to break the land and get the contemplated acreage seeded. This has happened a number of times in the past in some sections, and it will pay every Agent to watch the Weather Bureau's rain-fall records very carefully during land-breaking and planting time.

There is at present no method of estimating acreage except by comparison with the acreage of the previous year. All of us recognize that this method has its faults. Even a census of acreage is not entirely accurate, for a comparatively small proportion of the farmers know the exact acreage planted to their several crops in any one year. This is especially true in the Southern States. It is extremely doubtful if half the farmers in the United States know within ten per cent the acreage planted to any of their major crops. In planting a cotton crop, especially, a farmer plants a field or several fields, very probably having never accurately measured the land. As the stumps are cleaned out, fences straightened, and the low

places filled in, he will from this means alone have a small natural increase in acreage from year to year. If a poor one, or the average negro tenant in the South, he will lose some of his original acreage from year to year from the encroachment of briars, weeds and bushes in fence corners and on turn rows and ditch banks. In the high-priced lands of the northern and western states, where farmers and tenants are of a generally better class, this will hardly apply. Also in a treeless or prairie country, a farmer can give a better estimate of his acreage than in less favored sections.

The price of a crop at planting time will influence a farmer very materially under ordinary conditions. High prices prevailing for his crops will spur him to greater efforts. The farmer is as likely to try to get his share of the prosperity floating around as the munitions maker or the rubber manufacturer. One can always figure that high prices for a crop will have a tendency to increase the acreage of that crop. With two dollar wheat and twenty cent cotton, few farmers planting these crops will pay any attention to those who preach that short crops bring high prices. Every farmer will plant all he can in the hope that Providence or some other agency will help him out by reducing the acreage in some other section of the country. Acreage has never been voluntarily reduced when prices at planting time promised considerable profit.

The cost of seed and fertilizers are factors also. The high price of high grade fertilizers caused a reduced acreage to be planted to truck crops, tobacco and cotton in some sections the past year. These influences will probably be felt in the early potato crop in the South this year, and may also have a tendency to reduce cotton acreage in some states the next season. Good planting seed will be hard to obtain by cotton planters in some sections, and it is almost an impossibility to secure high-grade commercial fertilizer because of the prohibitive price of potash.

When conditions are prosperous and prices high, a farmer is not only influenced to put forth his best efforts to secure a large crop by planting a heavy acreage, but he will cultivate it better and harvest it more closely. Likewise the tenant farmer will receive encouragement from his landlord, and will be spurred to his best efforts by his merchant or factor. He will be furnished with ample supplies, teams and money to employ labor. He will be urged to plant a full acreage in the crops promising the greatest returns at harvest time. He will probably stop his children from school if unable or unwilling to hire the necessary labor, and will join in the scramble to get a record crop while top prices prevail; and acreages are increased. During a period of depression, money is hard to obtain, merchants do not care to furnish a farmer or his tenant with much money or supplies. There is not the incentive for gain to spur one to his best efforts, and the tendency is to decrease acreage.

Insect pests exert considerable influence on acreage. If a wheat farmer is reasonably sure that the chinch bug, the hessian fly, or other insect pest may destroy a large portion of his crop, he will not plant wheat, but some other crop that will not be injured by this influence. Likewise a cotton planter when he finds it impossible to make a profitable crop under boll weevil

conditions will bend his endeavors in another direction. In some sections, insect ravages have materially influenced the acreage planted to several crops, and this will continue. This is a problem, however, with which every Agent who knows his territory is acquainted, and it is one of the first things one should familiarize himself with in going into new territory. Boll weevil ravages in Texas have resulted in a decrease in cotton acreage and a heavy increase in peanuts in certain counties. The same conditions prevail in other sections, only the crop following cotton may be different in different states. Following a weevil invasion into new territory, farmers are very panicky, and the reduction in cotton acreage the first few years is very heavy. Then as methods for controlling the ravages of the weevil are learned, there is a tendency to gradually increase the acreage from year to year. However, it is extremely doubtful if the acreage once lost is ever entirely regained. It is impossible to grow as many acres of cotton per team under weevil condition as before. Besides, the weevil forces the practice of diversification, which, when once learned, is ever afterwards continued by farmers.

Under normal conditions there is about an adequate supply of farm labor for the crops planted. This is natural, for no matter what the desires of a landowner are in regard to his acreage, he will plant only what he thinks he can have properly cultivated. Farm laborers, being mostly untrained, are generally more poorly paid than workers in industrial plants. Capital goes where there is the greatest demand for it, and so does labor drift to places where it can secure the highest wage. With European immigration entirely cut off, and industrial plants running at their greatest capacity and enjoying unexampled prosperity, it is natural for even inexperienced laborers to drift to the manufacturing centers. The demand at present for industrial workers is probably the greatest this country has ever known. Thousands of erstwhile farm hands are today employed in automobile factories, munition plants, railroad shops, saw mills, etc. In addition, thousands of young men, formerly employed on the farm or in the factory, are today engaged in doing guard duty on the Mexican border. These able-bodied young Americans are, for the time being, removed from farm or industrial employment, and their places have been filled by others, largely recruited from farm laborers. This situation is one, also, which will bear watching. Should the European war end in the spring in time for the return to the farm of laborers otherwise employed at present, it is probable that the resulting abundance and cheapening in farm labor will be reflected in larger crops planted. This is especially true in the cotton states where thousands of men have left agricultural situations to engage in the more remunerative employment offered in the industrial plants in the northern and eastern states. As is usually the case, it is the more ambitious workers who have attempted to better their conditions. The labor left behind is of poor quality, is high priced and more than usually independent. It is an undisputed fact in the South, that the unambitious negro (a considerable portion of his race, and the principal farm laborer) only works sufficiently to keep himself supplied with his immediate wants. The higher the wages he receives the longer it takes him to spend it and the less time he will work. It is feared that the labor problem the coming season will be the most serious one faced by the farmers in many years, and it may have a direct influence in reducing

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acreage, especially should the weather interfere with farming operations during land-breaking and planting time in the spring.

Legislation and resolutions have absolutely no effect on acreage. This has been demonstrated several times in the past. The influences heretofore enumerated are the principal ones to watch by those who make a study of acreage. Then one must know how to discount the prejudiced reports of many of his reporters and must learn the leanings, which he can in time, of those whom he interviews or comes in personal contact with during his travels over the territory for which he makes reports.

January 24, 1917.

GENERAL METHOD OF ASCERTAINING ACREAGE.

BY

W. F. Callander.

I think we all realize that the most difficult, as well as the most important work of the agent is that of estimating acreage, because no matter how carefully we may estimate condition and average yields, unless the acreage has been determined with approximate accuracy our work will lose most of its value. In every State there are conditions peculiar to that State and special methods will have to be adopted to suit the conditions, but there are several general methods which are more or less common to all. In Wisconsin I have used six general methods in arriving at the acreage of various crops.

- (1) Personal Field Investigations.
- (2) Reports from the regular field aids or correspondents.
- (3) Assessors' acreage reports.
- (4) Form 4206 (Small green form)
- (5) Form 4183 -- Special acreage inquiry (Long green form)
- (6) Data from selected farms.

(1) Personal Field Investigations. I have not found that I have been able to secure much information relative to the acreage of corn, oats and hay through field inquiries for the reason that but a very small percentage of these crops is marketed direct--they are fed to the stock on the farm--and the local elevators and grain dealers know very little about the acreage. With barley, rye, potatoes, cabbage, onions, tobacco, etc.,--cash crops, however, I am able to secure considerable information from the buyers and shippers of these products as to acreage because the local buyers make it a point to get in touch with the situation.

(2) Reports from the regular correspondents. With the general crops these reports form the backbone of sources of information, but I have found, as no doubt most of you have, that the drag of the inefficient correspondent and, shall I say, the pessimistic correspondent tends to confuse the results. After listing the returns, therefore, and getting the straight arithmetic average, for each district I make a study of the returns on the sheet before me, and take off on a sheet the returns from those correspondents whom I know are the best posted with respect to acreage and I also find the mode, or the most frequently occurring number in the reports for the particular district being studied. I compare these with the information I have been able to secure from personal investigations and with the returns from the same district for the previous years.

(3) Assessor's Acreage Reports. While the statistics collected by the assessors in Wisconsin leave much to be desired and can not be used as absolute figures, yet I consider them extremely valuable in

determining the trend. I have tabulated these figures by county back as far as the Census year for purposes of comparison, and I have also tabulated them by district and worked them out in a percentage basis for purpose of comparison with the returns from correspondents. Unfortunately they are always a year late and can only be used for purposes of revision, except that from a study of the general trend for past years some light is thrown on what may be expected in the future, other factors remaining the same.

(4) Form 4206. I believe that this form is going to be of great help in the ascertainment of acreage. So far I have only had opportunity to use it in connection with the crops sown last fall, but the results were extremely satisfactory. I sent the blank to several hundred names--supervisors, assessors and township clerks of townships in all of the counties where winter wheat and rye are grown to any extent and got very satisfactory returns. Some of those who reported went to considerable trouble to get data before sending in their report.

(5) Form 4183. Special Acreage Inquiry. The returns from this inquiry as to the number of acres devoted to each crop in every 1,000 acres have been far from satisfactory and many obviously inaccurate. If sufficient satisfactory returns could be secured from such an inquiry, I believe it would be extremely helpful in working out our acreage problems. I believe if it were sent to all of the township correspondents as well as to the field aids and the results tabulated together, it would be more satisfactory.

(6) data from selected farms. So far in Wisconsin I have not used this method to any great extent. The College of Agriculture is making a yearly survey of about three hundred farms in six or seven different counties. These records were started a year ago, and it is the intention to keep the record on individual farms for several years. These records are on file in my office--the man in charge shares my office with me--and I have started to tabulate the returns. I wish, however, to start a number of my best correspondents keeping such a record for their own farms if a satisfactory blank can be worked out.

January 24, 1917.

SPECIAL METHODS OF ASCERTAINING ACREAGES.

BY

B. B. Hare.

It is exceedingly difficult to arrive at a dependable estimate of the acreage of any crop unless you have some known figure or condition to use as a basis upon which to work. And after a basis is established there is no one method either "general" or "special" that does not have some weakness or imperfection. It is essential, therefore, that the Field Agent have as many methods as he can conveniently use for arriving at an estimate that will represent the facts as they apply to the base figure.

It is reasonably easy to estimate acreages for a year or so immediately following the establishment of a known acreage by arriving at a percentage of increase or decrease as the case may be as compared with the previous year, and if the estimates are carefully made they become a safe basis upon which to determine estimates for succeeding years. But in case of an error, though it be small, it frequently becomes cumulative when comparing one year with another and after a number of years reaches such a magnitude as to make the estimate wholly unreliable. The Agent should keep in mind, therefore, that the estimates of one year are to be the basis of estimates for succeeding years, and in order to secure the greatest accuracy he should endeavor to arrive at his conclusion from as many angles as possible.

In discussing "SPECIAL METHODS OF ASCERTAINING ACREAGES" I can only give those followed in my work and in doing so I am sure to duplicate some of the GENERAL METHODS already discussed in a very able manner, by Mr. Callander. The first step is to arrive at a figure or figures representing the total acreage planted to all field crops, this being easier and more readily found than that for any particular crop. This is true whether you use a known figure as a basis or whether you do not. If the known figure is used the total acreage is probably less changeable from year to year than of a particular crop and the possibility of error is, therefore, more remote than when making an estimate for particular crops and when adding them for the total acreage. If you do not have a known figure as a basis it is better, as I have already suggested, to first get the total acreage under cultivation, for an aid can easier estimate the total cultivated acreage of his farm than he can the acreage of particular crops. The total of which would represent the cultivated acreage in his farm.

The two methods used for arriving at percentage of increase or decrease of acreage as compared with a known figure or that of a previous year are as follows:

FIRST. Count all cultivated fields on one side of railroad throughout itinerary, by crops, listing them in small loose leaf binder as follows:

COTTON	llll	CORN	llll
WHEAT	llll	OATS	llll
		MISCELLANEOUS	lll

When passing a field make a note indicating the crop to which it is

planted; total these records at the end of each stop; ascertain the average number of fields per mile traveled; and arrange results by districts. The data of course will be of little value the first year except to give a fair idea as to the proportionate acreage of one crop bears to another and to the total cultivated area, but they afford an excellent check as to increase or decrease of acreages when compared with corresponding data in succeeding years.

SECOND. The other method used with equal or more satisfactory result is that of securing reports from individual farmers who give the actual acreage planted to various crops on their farms for a period of years.

SPECIAL METHODS. The only method used in my work for ascertaining acreages for all crops as well as individual crops without having some known figure as a basis is by obtaining the average number of acres planted per plow and compute the total from the number of plows run. In the State of South Carolina the number of adult horses on farms as reported by the census in 1910 was practically the same as the number returned for taxation and reported by the Comptroller General for the same year. It is assumed that the total number of adult horses and mules will represent the total number of plows run. I have taken, therefore, this number as reported from year to year by the Comptroller General as representing the number of plows run as a basis for computation. The data may be worked up by districts, showing the number of acres usually planted in cotton, corn, wheat, oats, etc., per horse. Farmers as a rule can give this information very accurately, for they plan their farming operations in such a way as to give a certain number of acres of each crop per horse. It is interesting to note the uniformity of this practice throughout the State. However, the acreage planted per horse is by no means uniform. In the lower half of the State the total number of acres per horse is about 25 while in the upper half the average is near 20. The average acreage for various crops per plow in 1916 were as follows: Cotton, 12 acres; corn, $6\frac{1}{2}$ acres; oats 2 acres; wheat $\frac{3}{4}$ acre; miscellaneous $1\frac{1}{4}$ acres; total $22\frac{1}{2}$ acres. This multiplied by the total number of mules and horses returned for taxation will give a fair estimate of the total number of acres actually in cultivation, and the total number of acres for each crop may be ascertained by multiplying the number of mules and horses already noted by the number of acres usually planted per plow.

January 24, 1917.

Relation of the Acreage of the Major Staple Crop or Crops
to the Acreage of Other Crops.

BY

J. E. Woodworth.

The question of comparing the acreages of all cultivated crops within a given area is of material importance, as a check if nothing else, in those sections where there are radical changes in the acreage of any of the major or minor crops. In any well settled country, the total acreage under cultivation, conditions being fairly normal, is almost a fixed quantity. Variations will occur, such as increases by breaking out new land, clearing forests, reclaiming lands by drainage, etc., but these are gradual, while climatic conditions such as extreme drought may materially reduce the actual acreage under cultivation. The suggestion, then, that the comparison or the relation of the acreage of one crop to that of another, either major or minor has some practical value, assuming that the total acreage under cultivation is fairly constant. In sections where some of the minor crops are growing in importance, a rigid comparison with the generally accepted and fixed acreage of some one or two major crops is about the safest plan we have.

The relation of the acreage of one class of crops with that of another group is especially worthy of consideration in sections where crops are greatly diversified, but the plan for determining this relation is the important matter for consideration. In fact it seems that results from the compilation of voluntary reporters are more satisfactory from those sections where there is a general diversification and where there is not such a wide spread between the acreages of some of the major and minor crops. The results have not been so satisfactory from those sections where one or possibly two major crops occupy 90 or 95 per cent of the cultivated area. The relative acreage of minor crops under that condition is easily overestimated. I can readily see that the most satisfactory results will be attained when the various reporters are selected, so that the area reported upon does not overlap the area covered by another reporter, and the number of reporters be increased to cover the entire cultivated area, thereby minimizing the unit of area covered by the reporters' estimates. The number of reports received for a particular area practically serve the purpose of "weights", hence it is absolutely necessary, in the absence of proper weights, to have reports equally and evenly distributed and the entire cultivated area thoroughly covered.

The first real use I attempted to make of the plan to compare the acreages of the cultivated crops was three or four years ago, when I attempted to make an estimate of the acreage planted to the grain sorghums, such as kafir, milo, etc. Since the census year, no estimate had been made of the acreage, and since there was such a material increase, particularly following the year 1911, it was impossible to make a percentage comparison of increase with that of former years. Many sections

were raising the kafirs in lots of thousands of acres where none was formerly grown. I attempted to make the comparison of the acreage of the grain sorghums with that of the fairly well established acreage of corn, wheat, oats and cotton. The results were not satisfactory, but I attributed my failure to the length and bunglesome nature of the schedule. I tried to find out too many things and the reporter was either confused or did not care to take the time to make the report in detail. The year following, with the assistance of our Bureau, I followed the same plan but made the schedules of inquiry more simple, and the results were sufficiently satisfactory, that we were enabled to determine upon a figure for the 1915 and 1916 acreage and production of the grain sorghum crops. With the plan of making averages of reports, I am not satisfied with the method of compiling the reports when considering the acreage of the various crops with each other. We have sections producing nothing but the grain sorghums, and we have other sections producing wheat mainly, or cotton almost exclusively. The one does not average with or offset the other.

The special schedule A. S. 4183, used in 1916 did bring out some interesting points, and particularly did the summary show the true distribution of the crops over the State. There is such a wide spread between the acreages of the major and minor crops, that to use the relative number of acres of the different crops per 1,000 acres of cultivated land, causes us to underestimate the acreages of the major crops and overestimate the minor crops. The corn acreage is most generally distributed, and invariably, it is my opinion that the acreage was underestimated. The many discrepancies so far apparent indicate to me that this method of securing information for the basis of acreage estimates is not yet dependable. I believe it will show the trend of the relative importance of the crops, and much valuable information as to the distribution of the crops may be obtained, but the relative changes of the acreages of the major crops in comparison with the minor crops, would, in my opinion, be underestimated and make the acreages of the minor crops entirely out of proportion.

Considering that the total acreage under cultivation is a fairly constant figure, the studies each year concerning the relation of the major crop acreage to that of the minor crops will have much practical value, but in my opinion, it is directly dependent upon the thoroughness with which the schedule of inquiry covers the cultivated area, making the unit of area for which a report is made, considerably smaller, say a township, and avoiding the over-lapping of the areas covered in the reports.

The acreage of the major crops is so large in comparison with the acreage of the minor crops, that small changes in the acreage of the minor crops would not be reflected in this method of comparison.

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January 24, 1917.

Relation of Total Acreage to Acreage of Particular Crops,
And Relation of Increase or Decrease in one Crop to Decrease or
Increase in Another.

By

F. L. Kent.

Generally speaking, the soil and climatic conditions of a given locality particularly adapt that locality to the production of some few specific crops. Often a large territory is given over to the growing of some one principal crop to the practical exclusion of all other crops, at least in a commercial way. Wheat and cotton, and to a less extent, corn, are instances of this sort.

In some of our states, or at least in a large portion of some of our states, wheat is practically the only commercial crop grown, and the acreage does not change materially from year to year. In certain districts the practice of summer fallowing is generally followed, but the farms are so arranged that about the same acreage is in crop each year. In districts of this sort it would seem to be self evident that an increase in total crop acreage would be followed by a corresponding percentage increase in the special crop of that section.

Now since some certain type of agriculture is generally pretty well established in each of the various sections of our country, we might naturally expect the increase in acreage of the various kinds of crops for the country as a whole, to approximate rather closely the percentage increase of the total crop acreage. We have not mentioned decrease in this connection for it seems probable that the crop acreage of the country as a whole will continue to increase for several decades in the future. Yet it is a fact that census returns indicate a falling off in total crop acreage in the New England and Middle Atlantic States.

A comparative study of the acreage devoted to the various cereals, does not reveal a uniform increase in acreage. Corn shows an increase of 3.7%, which is very close to the general cereal average of 3.5%. But oats show an increase of 19.0%, and barley, 72.2%, while the wheat acreage indicates a decrease of 15.8%. Refined corn and rough rice show increases of 513.5% and 78.3%, respectively.

Cotton shows an increase during the ten year period of 32.0%, and sugar beets an increase of 230.5%. Potatoes increased, 24.8%.

It will be observed from the foregoing that with an increase of 9.9% in the total crop acreage, the changes in acreage of some of the leading staple crops range from a decrease of 15.8% in the case of wheat, to an increase of 72.2% in the case of barley. A comparison of the data furnished by the two last census enumerations therefore, fails to establish any harmonious relation between the increase in total acreage and the increase in acreage devoted to any particular crop.

Estimates for 1916 and the years immediately preceding, do not indicate that the increase in the total crop acreage has been relatively greater during the years following the last census than for a like period of time prior to the census enumeration. In fact, it is reasonable to suppose that the percentage increase in crop acreage will diminish with each succeeding census enumeration.

Our investigations, therefore, indicate that in localities where some one particular crop greatly predominates, a change in total crop acreage will bring about a similar change in the acreage of the major crop, and if we can arrive at the change in total acreage, through county assessor's figures or otherwise, we should have a fairly accurate figure to apply to our major crop. This figure may in some cases, be used for an entire state, and quite often for one or more of the regular districts into which we divide our respective states.

But in districts where two or more kinds of crops are largely grown, the percentage relation existing among these several crops will usually vary considerably from year to year, being affected by climatic conditions, prevailing price, insect ravages, plant diseases, and other conditions. In estimating changes in acreage under these conditions we will have to be guided largely by information received as to "last year" and "the usual". Naturally, any considerable change in acreage of any major crop, will be accompanied by an opposite change in one or more of the lesser crops.

However, as the agriculture of our country becomes more fixed in practice, which will include the establishment of crop rotations on practically all farms, the acreage of the various crops will be subject to much less annual variation, and when actually determined each ten years by the Census, will doubtless show a fairly constant relation between the total acreage and the acreage of particular crops.

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January 24, 1917.

ABANDONMENT.
BY
G. L. Morris.

There are many things that enter into the study and the forming of an estimate on the amounts that are abandoned of different crops; so far, I believe, that an estimate on the abandoned acreage of only two crops, wheat and cotton, is undertaken; while of one other, rye, there is a difference made of the acreage planted and the amount harvested, and in my judgment there is at least two others, viz. oats and barley, to which this latter principle should be made to apply.

There are a number of things that enter into making an estimate on abandonment, and I shall take these up in the order herein named: Natural abandonment; Abandonment from outside sources; such as, Insects, Freezes, storm and flood, Drouth, Frost, Adverse weather conditions, and abandonment from what might be termed laziness.

In natural abandonment we have the largest per cent. Especially is this true in the wheat crop, where the farmer, as it is in my state, in sowing his crop, sows land, and at the time he is sowing he knows full well that from part of this land he will harvest no crop. Spots of land being too poor, or being of a wet nature, he knows that it will winter kill, but rather than leave these spots bare, he sows them, as he should, rather than leave these as eye sores in his field. The percentage of this character of abandonment varies in amount from year to year according to crop conditions, and I believe can be safely figured on to a more or less degree in all states, and varies up or down as conditions approach that of normal or fall below; for in normal seasons the amount of abandonment from this source will be reduced to the minimum, but when growing conditions are unfavorable we may expect the amount that is abandoned from this cause to run higher, governed almost solely by the growing condition of the crop. The surest plan for forming an estimate of the amount abandoned from this cause is, to know your state, especially those sections that grow this or that particular crop; another cause of natural abandonment, is, and I am sure the same is true of many other sections besides my own state, the irregularity of the fields and lands under cultivation, leaving strips and corners that can not be harvested, and in the case of the rougher sections knobs and hill-sides impossible to harvest, and irregular streams and gullies that cut up the lands make it impossible to harvest many of the crooks and turns. This is one form of abandonment that varies but little. In the cotton crop these natural causes are much less, as the farmer as a rule does not plant land that will not produce something, and I have found that this form of abandonment is small in this crop.

Abandonment from outside sources:-

Insects: This form of abandonment is very irregular, as it is worse some seasons than others, and the same is true of different localities and the actual facts hard to obtain. The average person reporting on this phase of the subject is too apt to over estimate, and the

surest plan is personal investigation, comparing the infested area with the county or the entire belt where this particular crop is grown. This may be done by estimating the acreage of the territory infested and comparing it with the whole. Of course heed must be given to all information secured, giving due consideration to the sources of this information, its reliability, etc., and making such deductions as honest judgment would dictate, after taking into consideration such bias as may be reasonably expected to exist in your informer.

Freezes: This is similar to some degree to the other forms of outside sources, and the same methods of information should be used, with the same reasoning regarding your information; while the Agent has this advantage in reckoning from this source, viz., weather conditions, by studying the effect that the weather conditions will naturally have on the crop, taking into consideration the time of planting, and the vigor or the lack of vigor the plant has to meet adverse conditions.

Storm and Flood: This form of abandonment is as a rule of a local nature, and the amount of damage and subsequent abandonment is usually greatly over estimated, and in such cases it is much better if the agent can make a personal investigation, comparing the damaged or abandoned area with the surrounding territory, and then with the whole.

Drouth: The same principles as above mentioned will, to a certain degree, apply to this form of abandonment. While instances of abandonment from this cause may be only local and in small spots, it is usually of much wider scope and covers much more territory than storms and floods, and when such is the case it is well that the agent understand the effects of extreme dry weather on the crop, and to know his state, and to know what effect it will have on different localities, and to make due allowance for exaggerated reports.

Frost: Is another factor that may cut some figure in abandonment of some crops, but this is of small consequence in my state, resulting more in the form of damage than of abandonment.

Adverse weather conditions: While this has to a considerable degree come under other heads, there are a few words to say regarding this phase of the subject. The principal cause and reason for abandonment under this head is to be found in extreme wet weather, when, after a crop has been planted and is in a fair way to make a crop, there is an extended spell of extremely wet weather, causing the crop to become very foul, to such an extent that the crop is seriously damaged, and the amount to be derived from such a crop is not sufficient to pay the cost of cleaning out and being put into a state of cultivation. This occurs to some extent in all wet seasons, such as we experienced in my state the past summer, and affected the cotton crop to some extent, and the corn crop to a much greater, and while no account was made of the abandonment of corn acreage, I endeavored to make this show in condition. Our best method for this kind of abandonment is a comparison of the wet lands with the uplands, but this is not always sure, as some uplands are more susceptible to this form of damage than are some of the lower lands. This is true in my state in many parts of what is known as the nighland rim.

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Laziness: This is the cause of some abandonment, but this is small, and I am glad to say that the amount is getting smaller each year, and is not worthy of consideration, and where it does occur can very easily be placed under some other head.

Summing up all phases of the subject of abandonment, and the best methods to be adopted in forming an estimate, it may be briefly summarized in this way: 1st. As complete a knowledge of his state by the agent as possible; 2nd. A study of the weather conditions and their effect; 3rd. A comparison as best he can of abandoned area compared with the unaffected; 4th. The gathering of all information possible by travel, conversations, personal investigation and reports of correspondents, making due allowance for bias and exaggerations.

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Major Influences Affecting Crop Yields.

Insects.

By A. L. Quaintance.

January 24, 1917.

In no part of the world are insect control methods more extensively and successfully followed than in the United States; also nowhere in the world do insect injuries so profoundly influence the success of crop production. During the development of our country, the substitution of cultivated crops for the native plants of the prairie and forest has quite changed the natural conditions surrounding our native insect species, which, by reason of an abundant food supply, have been able to increase in enormous numbers. While there are numerous native insects of first class importance, the considerable majority of our worst insect pests have come to us at various times from abroad. In most instances these introductions have become more destructive than in their native homes for reasons not always clear, but in some instances from the fact that their insect enemies which at home serve to keep them reduced have not been brought over with them.

The number of insects attacking a given crop is often astonishing. Thus, the apple furnishes food directly or indirectly for upwards of 400 different kinds of insects; the grape for some 200, and about the same number has been recorded as attacking peach. Corn is fed upon by at least 50 fairly important destructive insects, and wheat and oats together, by perhaps twice that number; 80 different species attack clover, while so new a crop as the sugar beet is attacked by at least 70 different insect pests.

Not all of these insects are injurious every year, but any one of the species which may at present be comparatively unimportant is liable at any time, under changed conditions of environment, to become seriously destructive. We thus have numerous insect outbreaks of species more or less unknown, as, in the case of the pear thrips, which threatened the deciduous fruit industry in California a few years ago; the so-called green bug, an enemy of grains in the middle west; the pea louse, which 10 or 12 years ago threatened the pea-growing industry in the eastern United States. There are, however, numerous species which do not greatly vary in abundance from year to year, and are, so to speak, chronic pests, which may confidently be counted on to put in appearance at stated times, and these on the average are responsible for our principal insect losses.

Not all insects, however, are destroyers of crops. Broadly speaking insects are good or bad as they favor or interfere with man's interests. A considerable proportion of our insect fauna feeds upon plants of no special economic importance, as on various wild plants, weeds, etc. A large number feed upon animal substances, including those which are parasitic and predaceous upon other insects. It may be well briefly to consider insects as a class in their relation to man.*

Insects are injurious:

- (1) As destroyers of crops and other valuable plant life.
- (2) As destroyers of stored foods, dwellings, clothes, books, etc.
- (3) As injuring live stock and other useful animals.
- (4) As annoying man.
- (5) As carriers of disease.

*Economic Status of Insects as a Class. L. O. Howard, Science, N.S. Vol.IX, p.233.

Insects are beneficial:

- (1) As destroyers of injurious insects.
- (2) As destroyers of noxious plants.
- (3) As pollinizers of plants.
- (4) As scavengers.
- (5) As makers of soil.
- (6) As food for man and poultry, song birds and food fishes, and as clothing and as used in the arts.

Insects are about equally divided as to their injurious and beneficial characters. Their injuries to forest and farm products, and to live stock and man doubtless include the principal losses which they occasion. Notwithstanding the large destruction of useful products each year by insects, these are largely offset by the assistance which the beneficial forms render in the destruction of noxious species and in the pollination of plants. It is perhaps not too much to say that our very existence depends upon these friendly insects which insure our crops by effecting the fertilization of plants, and which keep down the injurious forms.

Insects are subject to the influence of various inimical natural agencies, as disease, parasitic and predatory insects, birds, rains, windstorms, forest fires, heat and drouth, etc. In spite of these agencies it is necessary for man to supplement their work by the employment of methods which will circumvent their injuries. The applied science of economic entomology has its foundation on this necessity. Broadly speaking our present battery for insect warfare is about as follows:

- (1) Various poisons, as Paris green, arsenate of lead, etc., for biting insects which are sprayed or dusted on their food plants.
- (2) Various caustic soapy, or other washes, as lime-sulphur wash, fish-oil soap, kerosene emulsion and crude petroleum emulsion, and tobacco solutions for use against sucking insects.
- (3) Poisonous gases, so employed as to poison the air breathed by insects, as hydrocyanic-acid gas, carbon bisulphide and the like, especially used in the destruction of insects in stored grain in mills and in houses.
- (4) The utilization of parasitic and predaceous insects and parasitic fungous and bacterial diseases.
- (5) Cultural methods, as timely planting, cultivation, fertilization, fall plowing, rotation, pruning, etc.
- (6) The employment of plants or parts of plants more or less resistant to insect attack, as for grafting stock.
- (7) Mechanical methods, as worming for borers, jarring for curculio, etc.
- (8) Legislation to prevent the introduction and dissemination of noxious species.

Despite these various remedial measures insect losses are each year in the United States very large. Numerous attempts have been made to express in terms of dollars and cents the annual shrinkage in value from insect attack, but these cannot be regarded as more than approximate estimates. One of the latest estimates on insect losses is that published in the report of the National Conservation Commission and is based on the crop yields for the year 1907. In this report by Mr. C. L. Marlatt the loss during that year to cereals was estimated to be \$237,-800,000; to cotton \$67,500,000; to tobacco \$69,000,000; to truck crops \$68,000,000; to fruits \$66,000,000; to miscellaneous crops \$18,000,000; to products in storage \$100,000,000; to national forest products \$30,000,000; to animal products \$267,000,-000; to insects as spreaders of diseases \$200,000,000, making a grand total of \$1,249,500,000 loss due to insect attack to all crops and products.

In addition to the actual monetary loss occasioned by insects in caus-

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ing a shrinkage in crop and animal production, the amount of money spent each year in insect control amounts to a very large sum. Thus in the case of the codling moth, an enemy of the apple controlled by spraying, probably not less than \$5,-000,000 or \$6,000,000 are spent each year in the application of remedies. At least an equal sum is spent in spraying operations against the San Jose scale, and similar large expenditures are made in the case of many other of our insect pests. The above figures of losses will indicate how important is the question of insect control in the welfare of our country.

It is the particular function of the Bureau of Entomology to investigate insects and to develop remedies for the injurious forms. The work is subdivided according to crops or subjects into offices or divisions. Thus, there is a division charged with investigations of insects injurious to deciduous fruits; to truck crops; to field crops; to cotton, sugar cane, rice, etc.; to subtropical fruits; to forests; to domestic animals, etc. Field laboratories are established in various parts of the country where the particular insect or insects to be investigated are most abundant and destructive. Such insects are thoroughly studied from all possible points of view so that full knowledge is obtained of their life and habits, their destructiveness, their natural enemies, etc. Experiments are carried out with remedies and demonstrations are often made on a large scale to acquaint growers with the treatments which have proven to be valuable.

It will perhaps be of interest to indicate the locations of the principal field stations or laboratories of the Bureau, as follows:

ARIZONA
Tempe
Tucson

ARKANSAS
Scott

COLORADO
Grand Junction
Colorado Springs
Rocky Ford

CALIFORNIA
Fresno
Sacramento
Pasadena
Placerville
Spreckels
Oxnard.

FLORIDA
Monticello
Orlando
Gainesville
Quincy

GEORGIA
Thomasville
INDIANA
Lafayette
Plymouth

HAWAII
Honolulu
KANSAS
Wellington
Wichita

LOUISIANA
Tallulah
New Orleans
Mound
Lake Charles

MAINE
Portland

MARYLAND
Hagerstown
Drummand
College Park

MASSACHUSETTS
West Springfield
Melrose Highlands
Boston

MICHIGAN
Benton Harbor
Big Rapids
Hart

MISSOURI
Charleston
MISSISSIPPI
Greenwood

MONTANA
Missoula

NEW MEXICO
Roswell
Maxwell

NEVADA
Reno
Deeth

OHIO
Sandusky

OREGON
Forest Grove
Ashland

PENNSYLVANIA
North East
Paxinos
West Chester

SOUTH CAROLINA
Columbia
Clemson College

SOUTH DAKOTA
Elk Point
Aberdeen

TENNESSEE
Nashville
Knoxville
Clarksville

TEXAS

Uvalde
Victoria
Brownsville
Dallas
Fort Worth
Beaumont

UTAH

Salt Lake City

WEST VIRGINIA

French Creek
Springfield

VIRGINIA

Winchester
Charlottesville
East Falls Church
Vienna
Norfolk

WISCONSIN

Madison

The investigations now under way by the Bureau cover a very wide range, as the following projects taken from the Program of Work of the Department will indicate.

Apple Tree Borers.
Codling Moth Investigations.
Peach Borer and Miscellaneous Peach Insect Investigations.
Grape Phylloxera and Miscellaneous Grape Insect Investigations in California.
Grape Berry Moth and Miscellaneous Grape Insects in the East.
Pecan Insects.
Cranberry and Small Fruit Insect Investigations.
Deciduous Fruit Nursery Insect Investigations.
Hessian Fly Investigations.
Chinch Bug Investigations.
Western Corn Rootworm Investigations.
Wireworm Investigations.
Native Species of White Grubs.
Jointworm Investigations.
Insects Affecting the Production of Clover Seed.
Range Caterpillar.
Alfalfa Weevil.
Insects Affecting Cowpeas.
Cotton Boll Weevil.
Tobacco Hornworms.
Insect Transmission of Mosaic Disease.
Rice Water Weevil and Other Rice Insects.
Sugar-cane Moth Borer.
Argentine Ant Investigations.
Forest-Reproduction Insects.
Interrelation of Insects and Forest Fires in the Destruction of Forests and Damage by Insects to the Wood of Fire-killed Trees.
Insects Injurious to Forest Products.
Hickory Insects.
Economic Investigations of the Scolytid bark and timber beetles of North America.
Insect-Control Instructions and Demonstrations in the National Parks.
Investigation of Insects Affecting Shade Trees and Hardy Shrubs.
Potato Insect Investigations.
Onion Insect Investigations.
Crucifer Insect Investigations.
Cucurbit Insect Investigations.
Sugar Beet Insect Investigations.
Insects Affecting Stored Beans and Peas.
Insects Attacking Greenhouse Vegetables.
Argentine Corn Weevil.

Wintering of Bees.
 Effects on Bees of Spraying Fruit Trees.
 Diseases of Bees.
 Demonstration Work in Bee-keeping.
 Citrus Fruit Insect Investigations in California.
 Citrus Fruit Insect Investigations in Florida.
 Citrus Fruit Insect Investigations in Louisiana.
 Investigations of Insects Affecting Tropical and Subtropical Fruits
 and Plants in Greenhouses.
 Geographical Distribution and Life History Studies of Fruit Flies.
 Eradication of Spotted-fever Tick in Montana.
 Relation of Malaria Mosquitoes to Agriculture.
 Control of the House Fly and Other Insects in Establishments Operating
 Under Federal Meat Inspection.
 Life History Investigations of the Cattle-fever Tick.
 Stable Fly.
 Screw Worms.
 Horseflies.
 Hornfly.
 Ox Warbles.
 Dispersion of Gipsy Moth.
 Scouting and Extermination Work with Gipsy and Browntail Moths.

The Chief of the Bureau of Statistics in inviting a representative of the Bureau of Entomology to address this body suggested that the field agents of his Bureau should not only know how to recognize the presence of injurious insects, but should be able to estimate the probable extent of damage as reflected in reduced yields. The Bureau of Entomology feels that the cooperation proposed would be very advantageous. As a first essential it is believed that the field agents of the Bureau of Statistics should learn to know the more important insect pests, their time of appearance and methods of work, which are present in the regions covered by their respective activities. Thus, an agent located in a fruit section should give special attention to the various fruit insects, as the codling moth, plum curculio, peach borer, San Jose scale and the like. An agent located in a grain country should know the principal grain insects, as the Hessian Fly, Jointworms, Chinch Bug, etc. An agent located in the cotton belt should likewise be familiar with the various insects which attack the cotton crop. The Bureau of Entomology has available publications on the more important insects injurious to crops, forest products and domestic animals, and can in most cases furnish copies of these upon request.

As to estimating the probable and actual amount of damage to crops by insects, the speaker does not believe that this is feasible, except in a very general way. The accurate determination of percentage of insect injury as codling moth injury to apples for instance, involves the critical examination, counting and classifying of many thousands of fruits, carried on throughout the season. In determining Hessian Fly injury to wheat, examinations of all plants in small unit areas must be made in different parts of each of several fields in a given locality. In determining percentage of injury to cotton by the boll weevil, cotton squares and bolls must be examined as to infestations and punctures on a large series of plants. Such work no doubt is quite impracticable for field agents concerned with crop acreages and yields. It would seem feasible however for agents to report in general terms on the abundance and destructiveness of insect pests, by such terms as: present in small numbers; abundant; very abundant and destructive, etc. In the case of unusual insect conditions especially, the Bureau of Entomology would be glad to be at once advised in order that remedial work could promptly be undertaken if practicable.

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In the course of their travels field agents of the Bureau of Statistics doubtless often visit towns in which are located laboratories of the Bureau of Entomology. It is urged that when possible agents visit the laboratories and get in touch with the work in progress in that region and confer with the man in charge as to insect conditions in the territory in question. Such conferences should be mutually advantageous.

In a broad way comparisons of crop yields in a given territory for a series of years, coupled with information as to insect abundance, furnish a basis for estimating insect losses. Such figures, however, to be of most value should be reported by counties and should show acreage of the crop in question and the average yield per acre. Such data when compiled for the country as a whole, and considered in the light of the geographic range of a given pest and the various natural conditions which limit its spread and destructiveness, furnish fundamental information which may be of much value.

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January 24, 1917.

RELATION OF INSECTS TO CROP ESTIMATES.

BY

F. W. Gist.

It goes without saying that the interest of the Field Agent in insect damage is confined to its influence on the acreage, condition, and yield of his crops. Past performances are only interesting to us in so far as they may be made the bases of comparisons in making forecasts for another season.

The best contribution I can give to this discussion is to give the results of my own study for the past two seasons of the relation of boll weevil activity to the yield of cotton.

Without going into details, I present a table showing the acre yield of cotton for the various counties in Alabama for the years 1914, 1915, and 1916, in which the counties are grouped according to the time of first infestation, and giving averages, unweighted, for the various groups. Figures are also given to represent the percentage of loss in yield which the crop of 1915 sustained from that of 1914, and the percentage of loss which the crop of 1916 sustained from that of 1914; the yield of 1914 being used as a basis of calculating the loss sustained in the two following years because it was the crop of highest yield in recent years and therefore nearest a normal to be found.

The county yields for the various crop seasons were estimated from all available data, including the reports of regular aids and those of individual farmers, the latter giving actual acreage and production. Of course prerogative of the crop estimator was exercised in harmonizing apparent discrepancies. The State averages in each instance will agree closely with the yield determined by the Crop Reporting Board, and the results are taken, at least in their relative value, as practically accurate.

The following summary for the various groups will suffice here, unless some agent interested in weevil activity cares to examine the data in detail, in which case it will be a pleasure to present it that way after school hours:

Group I. Counties first infested in the fall of 1911:			
Average yield 1914	- - - - -	213	
Average yield 1915	- - - - -	87	
per cent of loss	- - - - -		60.0
Average yield 1916	- - - - -	36	
per cent of loss	- - - - -		83.1
Group II. Counties first infested in the fall of 1912:			
Average yield 1914	- - - - -	214	
Average yield 1915	- - - - -	105	
per cent of loss	- - - - -		50.1
Average yield 1916	- - - - -	39	
per cent of loss	- - - - -		81.8
Group III. Counties first infested in fall of 1913:			
Average yield 1914	- - - - -	199	

Average yield 1915 - - - - -	118	
per cent of loss - - - - -		40.7
Average yield 1916 - - - - -	36	
per cent of loss - - - - -		81.9
Group IV. Counties first infested in fall of 1914:		
Average yield 1914 - - - - -	216	
Average yield 1915 - - - - -	165	
per cent of loss - - - - -		23.1
Average yield 1916 - - - - -	71	
per cent of loss - - - - -		67.1
Group V. Counties first infested in fall of 1915:		
Average yield 1914 - - - - -	210	
Average yield 1915 - - - - -	164	
per cent of loss - - - - -		21.4
Average yield 1916 - - - - -	96	
per cent of loss - - - - -		54.3
Group VI. Counties first infested in fall of 1916:		
Average yield 1914 - - - - -	230	
Average yield 1915 - - - - -	193	
per cent of loss - - - - -		16.1
Average yield 1916 - - - - -	133	
per cent of loss - - - - -		42.2

The latter group is not considered to have suffered any weevil damage during the past season, nor the two last groups in 1915.

Three maps are presented showing the county yields within certain limits, as indicated in the legend under each.

Map No. 4 shows the percentage of loss sustained by the various counties in 1915, within certain limits of average, indicated by colors, and also showing in the margin the average for each group.

Map No. 5 relates to the same data for the year 1916.

The weevil lines shown on these maps are those established by the State Entomologist.

Chart No. 1 indicates the average percentage of loss in yield, the four colors representing the counties grouped according to non-infestation, and one, two, and three year infestation, the years 1915 and 1916 being thrown in comparison in each instance.

Chart No. 2 illustrates the average yield per acre of the various infestation groups for the years in comparison.

Chart No. 3 illustrates the average per centage of loss which may be said to be chargeable to the weevil, the three colors representing the one, two, and three year groups, and the two years of 1915 and 1916 being thrown in comparison in each instance. This percentage is obtained by subtracting from the percentage of loss in each group the percentage of loss for the non-infested group.

Something of the effect of unfavorable climatic conditions on weevil activity will be noted from the data and the illustrations. Without presenting the weather in detail, it may be stated that the growing season of 1915 was close to normal in so far as temperature and rainfall and their distribution affect weevil reproduction; while the season of 1916 was very abnormal, especially in the critical month of July, when a very low percentage of sunshine, a very heavy amount of rainfall, and little cessation of weather favorable to weevil propagation occurred. The following summary showing a comparison of the loss, by percentage, chargeable to the weevil in the infested groups may be taken to indicate to some extent this influence.

	Loss chargeable to weevil.		Excess of loss. 1916.
	1915	1916	
Counties infested one year	.03	.13	.10
Counties infested 2 years	.21	.26	.05
Counties infested 3 years	.33	.41	.08
Average	.19	.27	.08

A knowledge of the weevil's habits leads to an acceptance of the relative value of these figures.

Knowing the ineffective methods of the tenant farmer in the cotton belt, it occurred to me to arrange these data in comparison with the percentage of tenant farmers. In the following summary counties were grouped with reference to the length of their weevil infestation, also with reference to their low or high proportion of tenants, and ratios obtained of the average percentage of tenants to the average percentage of loss in yield. The year 1915 was selected for this comparison because of its more uniform climatic and fertilizer influences:

	Lower proportion of tenants.			Higher proportion of tenants.		
	Per cent tenants	per cent loss	Ratio	per cent tenants	per cent loss	Ratio
Infested one year	34	12	.35	62	39	.63
Infested two years	54	24	.44	63	54	.83
Infested three years	49	36	.75	64	57	.89
Average	46	24	.52	63	50	.79

Chart No. 4 represents this comparison in colors.

This study is found to be valuable from the standpoint of the crop reporter for the following reasons:

It demonstrates the practicability of reducing estimates of yield to county units, which with cotton is especially valuable when taken in connection with the gin reports.

It proves the theory that the maximum of damage by the weevil may be expected with the third year of infestation and that it remains somewhat stationary thereafter under similar conditions.

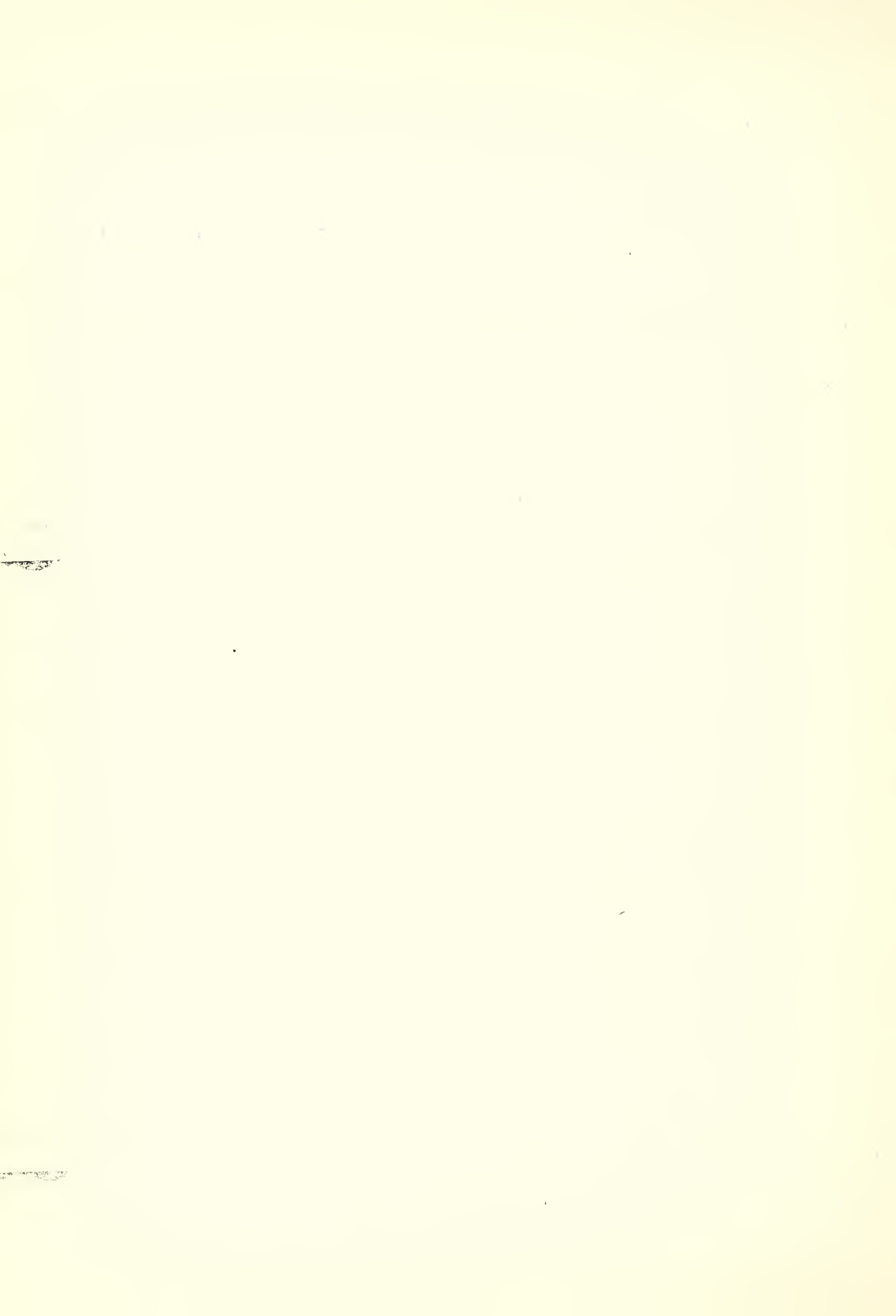
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It shows that, other influences being equal, heavy rainfall and a large measure of cloudiness will indicate a greater proportionate damage by the weevil.

It shows that weevil damage may be expected to be heaviest in sections where the highest proportion of tenant farmers is found.

I suggest that the methods underlying this study may be applied to other sections and to other insects.

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54-A
January 24, 1917.

PLANT DISEASES.

By

A. J. Surratt.

In considering the topic assigned to me, which is plant diseases, I take it for granted the Bureau had in mind the enormous rust damage to grains, especially Spring wheat in the Northwest this last season. My discussion, therefore, is largely along that line.

All of the plant diseases that I have observed as existing in my State are of the fungus family. There are several of these, but the only diseases that appeal to me as being serious enough to mention are the Smuts, Blight, Rusts and Flax Wilt. The rusts, of course, being decidedly the more important and general in its ravages.

I will only mention briefly the smuts, as probably all of you are more or less familiar with its method of damage. Stinking Smut is the chief variety in our section of the United States. The disease attacks the grain head itself, practically destroying the kernels and leaving in its place the kernel formation filled with fine, dark colored powdery-like dust spores. It has an offensive odor, readily recognized by one familiar with handling wheat. This condition causes the miller an unusual amount of work to separate the smut kernels from the good wheat. Therefore, it is given a low grade by buyers and considered extremely undesirable. This disease is kept quite well under control by treating seed with weak solution of formaldehyde.

The blights are usually recognized by presence of white heads in grain fields. This disease may kill the entire head, or only part of the head, depending on just where the fungi has attacked and destroyed the plant cells of the main stem. Damage from this source is inclined to be limited and apt to be overestimated. However, I have seen individual fields this last season that indicated a 5% loss from this cause, but such a condition was not general as a rule. Flax Wilt in flax in a general way is somewhat similar to blight in that the plants in spots will begin to wither suddenly and within a few days a field will show several spots in which the plants are dead. This disease varies, being rather severe in some seasons and barely noticeable in others.

The disease, as a rule, is more pronounced in adversely dry seasons and on rather weak soils. There is no set period when the damage may attack the plants. It may attack the plant any time after sprouting up to the filling period.

Now in regard to rust, in order that you may understand the attitude of the farmers in the Northwest towards the rust diseases. I will say that just as the boll weevil is greatly feared in the cotton belt and correspondingly the Hessian fly in the winter wheat belt, rust is feared in the spring wheat belt as the dominant damage factor.

All the grain or cereal crops are subject to rusts. There are several varieties of rust well known to the plant pathologist, but to the average farmer, dealer or individual in the community, the most widely known and spoken of are the leaf or red rust and the stem or black rust.

Leaf or red rust is present practically every season, but seldom does any serious damage, as it is confined mostly to the side leaves. Stem or black rust is the variety chiefly responsible for enormous wheat damage. While all grains and even grasses are attacked with rust with varying degrees of damage, wheat seems to be the most susceptible to the attack and the ravages of the disease.

The so-called black rust, coupled with heat damage, caused a reduction last season of over 50,000,000 bushels from the earlier forecasts made by the Bureau for Spring wheat production in North Dakota.

The fungi, which causes black or other rust, is a microscopic fungi or rather a plant parasite. It grows from these microscopic spores. Rust, as seen by the naked eye, is as a rule, a little round, or long red or black spot like a fly speck, which is a mass of these spores, first in the red stage and later turning black. In other words, black rust is only the more advanced stage of red rust. It requires about ten days from time of germination for rust to break out as a spot and to begin their evolution anew. When one of these small rust cells bursts, the number of microscopic spores that are released is almost countless in number, thus the breeding is very rapid.

The most effective weather for spreading rust may be described muggy, showery, sultry with rather still hot days, with foggy, cool, or dewy nights at the early filling period. Wind is the chief carrier, and spores probably live over Winter on old or decayed vegetation. The common barberry bush is considered the most active breeder. That is - rust is usually found on the green leaves of this plant first each season. Laws are now advocated to eradicate this bush.

The nature of rust damage is - tearing open the skin of the stem of the plant and breaking down plant cells beneath its location. An infected stem is often practically covered by these spores, or at least practically encircling the stem at some point. The result is that with the plant cells broken down, the flow of plant food stops. The grain kernels show no further development, but begin to shrink. The extent of shrinkage depends, of course, upon the state of development at time plant life is killed. This last season the infection was very severe and earlier than usual; quality of grain was the poorest in history of the state. No effectual method of control has been found.

The Department of Agriculture recommends seeding only early and hardy varieties of the more disease resistant types, as some of the durum. Their object is to endeavor to mature the crop before the rust infection can do serious damage, also to eradicate all, known breeding agencies, such as the barberry bush and old vegetation.

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January 25, 1917.

COUNTY AVERAGE YIELDS.

By

J. R. Covert.

There are many interesting studies in progress in this Bureau, and the one concerning which I am privileged to speak is the average yield per acre. This study covers eleven crops, corn, winter and spring wheat, rye, oats, barley, flaxseed, buckwheat, hay, potatoes, and tobacco. Beginning with 1911, the annual yield per acre as reported by the township correspondents has been averaged by counties, a straight average being struck by years and for the five-year period 1911-1915, and the five-year average has been mapped, one map for each crop.

Before beginning a discussion of results, a word of caution is necessary. There must be no confusion of yield per acre with acreage. This discussion concerns only the yield per acre. From the standpoint of distribution, hay and potatoes stand first, there being few counties indeed from which a greater or less number of returns was not received. Wheat, winter and spring, closely follows hay and potatoes, but tobacco apparently is last in this respect among the crops considered.

I shall not presume upon your patience to listen to a discussion of isolated yields per acre. Doubtless there are errors in some of the reports and now and then indications are that some correspondents have been guilty of using commercial fertilizers, but it is not always clear whether it was the correspondent's farm or his report to which the fertilizer was applied. Taken as a whole, the figures are quite consistent. In statistics as well as in war, every man counts and safety first should be the slogan. Too many county averages are based upon the report of a single correspondent. However, the effect of an error in a given year is diminished in the case of a five year average, and when the averages are mapped the more flagrant errors are quickly located.

A few years ago, under my direction this Bureau undertook a study of the dates of sowing and harvesting twenty or more of the leading cereal and forage crops of this country, thousands of correspondents cooperating. Just as is the case with the average yield per acre, the multiplicity of returns made the mapping of individual reports utterly impracticable, and averages were successively built up, beginning with county averages, and when the final averages were mapped, areas having approximately equal dates were quickly connected by lines which, in a general way, run from west to east, but with many curious deflections to the north and south, due to a variety of local causes.

In a similar way, I have connected areas wherein the yields per acre are relatively high and, with your permission, I shall undertake briefly to mention a few of the more striking details. Instead of having a west-to-east direction, the trend is north-east to south-west.

There is no unbroken belt of high yields per acre stretching across the country, but, scattered about more or less heterogenously, are areas varying greatly in size wherein the yield per acre is relatively high. I was led by curiosity to compare the maps showing the yield per acre with a soil map prepared for me by Prof. Marbut of the Bureau of Soils. This map shows the location of certain soils whose physical properties and chemical composition differentiate them from most other soils, and, when compared with the areas having high yields per acre, a surprisingly intimate correlation is found to exist. Anyone with a knowledge of the location of these types of soil can easily demonstrate to his own satisfaction this correlation of yield per acre with type of soil.

Did my allotted time permit, it would be interesting to discuss at length the glacial origin of some of these soils and to explain how in obedience to the laws of gravity the glaciers, in descending to temperate regions from the arctic zone assumed a north-east to south-west direction, bringing with them the soil of what was then an almost tropical climate, but which is now our arctic circle.

The dates of sowing and harvesting are influenced by a number of factors among which are latitude, topography, climate, and certain physical soil characteristics which make some soils early and others late.

The yield per acre is influenced to some extent by these same factors, but the greatest single factor is the chemical composition of the soil. From a national viewpoint, our farming is merely an exploitation of natural resources. In numerous spots here and there throughout our temperate zone Mother Earth yields abundantly and farmers in such areas are prosperous and progressive. In the train of wealth there is always leisure, and to the perceptive mind leisure spells opportunity, social improvement, and the acquisition of knowledge. These fertile spots on Mother Earth are soon marked by the progress and intelligence of the farming population, but after all, the difference is attributable to the chemical composition of the soil, rather than to the human element.

BASIS OF CONDITION FIGURES.

By
S. D. Fessenden.

We all know how condition figures are obtained -- from the information obtained from the various corps of correspondents though modified perhaps at times by the personal opinion of the field agent formed from his own observations. In theory the condition figure is a percentage of a so-called "normal" condition which has been defined in publications of this Bureau practically as follows: The full normal may be described as a condition of perfect healthfulness, unimpaired by drought, hail, insects or other injurious agency and with such growth and development as may reasonably be looked for under these favorable conditions. It is not an average condition, but one above the average, and it does not indicate a perfect crop, but something less than that. Theoretically this is the best basis that can be fixed, and although a normal condition does not indicate the same yield per acre in all sections, yet for purposes of discussion it would seem to be a clear understandable point to work from.

As stated before the condition figures of our reports are based principally upon the figures given us by our correspondents and do, I think, represent as a rule the average opinion of the men reporting. Upon what is this average opinion based, what is the condition of 100% with which the average correspondent compares an existing condition of any given crop? Is it the "normal"? I think not. It seems to be an almost impossible thing for the average man to keep in mind a clear conception of the normal crop. It is the average crop of which he instinctively thinks when fixing upon a condition figure. The average crop can be represented by figures -- not always accurately perhaps, yet when thinking of an average the mind of one informed tends to fix a definite figure for the locality with which he is acquainted. This is not so with most men when the "normal" is considered.

If I am right in what I have just said, then the condition figures of past years represent a comparison with the average crop for many years past, instead of, as is our theory, with the normal crop. This makes these figures strictly comparable from year to year, even though they are not made on the basis that the Bureau has settled on. For this reason it behooves the field agent, who may be able to fix clearly in his mind a condition figure as a per cent of the normal, to be careful in making changes in the condition figures of his correspondents. If he does so and his figure, based on his conception of the normal, is accepted by the Board, it may destroy the strict comparability of that report with those which have preceded it.

If I am wrong in my belief that an average crop represents 100% in the mind of the correspondents and the bulk of them are really thinking of the normal, the agent should still be very discrete in making changes and before doing so should make himself very certain that the figure he conceives as representing the condition is more nearly right than that of his correspondents, for should he be wrong, and his figure go on record, then in this case, the comparability of the figures for the different years may be destroyed.

There are however many plain cases when he may be warranted in modifying the figures of his correspondents. These occur occasionally when sudden or wide spread disasters happen, such as floods, destructive storms or periods of drought. In times like these, the fear generated by the certainty of disaster seems to temporarily affect the judgment of the best informed and most intelligent men particularly if they are financially interested, and the damage actually done or in prospect is practically always overestimated. Then it is that the clear impartial judgment of a well informed agent may be exercised to good advantage to modify the figures given him by his correspondents.

By dwelling with some emphasis on the comparability of condition figures for a series of years, I do not mean that the Bureau should be satisfied with erroneous figures of condition if it can obtain correct ones, simply because similar errors have been made in the past. I should believe in always showing the exact truth if by any method it could be reached even if the comparability of the figures for a series of years should be destroyed thereby. We know however that there is no known method that is certainly more than approximately correct. While this remains true it is better to keep the figures of the different years upon the same basis. From a comparison of such figures, one year with another, year after year, the general trend of crop conditions may be accurately learned. So too the crop to be expected from certain conditions may be prophesied with more and more accuracy by the Bureau after a study of years of the relation of the continuing monthly condition figures to the final crop returns. If, however, the basis for condition figures is modified and changed one year from another, then their value for these purposes is destroyed.

You may think from what I have said I am taking too strongly the view of the statistician, of the student of figures and dwelling with too much emphasis on doing our work with a view to its future use by the writer on economics. Lest I should be misunderstood I will say that in my opinion, we should strive above all things in our work for accuracy and for as near to an absolute showing of the facts as possible. Our work is not alone for the needs of the future, to enable those who come after us to more accurately ascertain the facts, it is primarily for the present. It is for the use of the vast army of men engaged directly or indirectly in agricultural pursuits and for those whose sustenance depends thereon. They demand the truth or the nearest possible approximation thereto today, for upon this often depends their success in business and their capacity to live and enjoy life. They have a right to this for they pay for the cost of the work we do, and to this end we should strive to attain by all possible means. It goes without saying that no finespun theories of adjustability or comparability of figures or scientific conceptions of well rounded statistical tables should be allowed to stand in the way of obtaining and publishing the truth or the nearest approach to it that this Bureau can obtain.

January 25, 1917.

Elements of Condition.

by

B. B. Hare.

The following are some of the fundamental factors or elements to be considered in arriving at an estimate representing the condition of any crop:

1. EARLINESS OR LATENESS OF THE SEASON.
2. RAINFALL, MOISTURE CONTENT OF SOIL, AND TEMPERATURE.
3. FERTILIZATION.
4. AMOUNT AND CHARACTER OF CULTIVATION.
5. PLANT DISEASES AND INSECT PESTS.

(a) It is not infrequent that an unusually early or late season will apply to the State as a whole or it may be normal in some sections and abnormal in others, all of which must be considered in connection with the time required for actual growth and maturity and the probable length of the growing season. In 1915 fair stands of cotton prevailed throughout the State by May 16th, while in 1916 it was the exception to find a good stand anywhere in the State on the corresponding date and it was not until about June 7th that fair stands prevailed, making a difference of at least three weeks in securing a stand in 1916 as compared with 1915, the growing season being reduced thereby about 13 per cent. The normal growing season for cotton in South Carolina extends from about May 1st to the first or tenth of October - 155 or 160 days - the growing season in 1916 being about 30 days less than normal. However, it cannot be said that because the growing season is 13 per cent less than normal that there will be a corresponding decrease from a normal condition, for the reason that cotton is a plant that can put on an excellent crop in a much shorter period than the usual growing season, provided all other elements are favorable. Just how much should be deducted from a normal condition by reason of a crop being 15 or 30 days late I am unable to say, and have devised no rule for determining it. However, there is no reason why, in the course of time, a key could not be worked up showing just what per cent should ordinarily be deducted from a normal condition and indicate what ought to be the condition of the crop taking into consideration only the earliness or lateness of the season.

(b) The rainfall and moisture content are important for the reason that the normal conditions of various crops are determined some by a heavier amount of rainfall than others, there being a few crops that require only a limited amount. To those that need a reasonable amount of rainfall or more it is vital to know whether they have received it or not and whether there is a sufficient amount of moisture stored away in the soil to produce a normal or less than a normal condition. For example, a normal cotton crop or wheat crop cannot be made in my State if there is an abnormal amount of rainfall at any time during the growing season, especially is this true with reference to wheat if the rainfall is in the month of May, and it is equally true with reference to cotton if it occurs in June and July. On the other hand, corn and potatoes and all succulent crops demand a much larger percentage of rainfall during these three months especially June and July, in order to insure a normal production. It would be very valuable if we knew the exact relation between the probable deviation of yield from a normal and the deviation of rainfall from the normal. Unfortunately, however, I have been unable to fix any mathematical relation between them. It may be that the Weather Bureau in cooperation with the Bureau of Crop Estimates will eventually be able to fix a certain condition that might be expected when a definite amount of rainfall is known, provided, corresponding conclusions can be reached in case of the other known elements of conditions.

Temperature should be considered in very much the same way as rainfall

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and moisture content of soil. That is, one must consider the relation between the actual and normal temperature and the tendency of the plant to register the effect when there is a deviation in the temperature either below or above the normal, especially should this be noted when reporting on condition of cotton and plants of similar habits, for, as many of you know, it is very sensitive to changes in temperature.

(c) The amount and character of fertilizers used is a very significant element of condition in those States where commercial fertilizers are applied to any great extent. The lower half and eastern third of South Carolina is made up largely of various types of sandy soils which require a large quantity of fertilizer, especially fertilizers with a higher percentage of potash as compared with other fertilizing constituents, the soil being very deficient in this one plant food. Without this particular fertilizing constituent it is physically impossible to grow certain crops with any degree of success. This applies particularly to cotton, and before fixing the estimate for cotton in this section you must consider the amount and character of fertilizers used. In the remainder of the State the lands are more or less red clay soils, which do not require as much potash to produce a normal crop as the sandy soils.

(d) The preparation of the seed bed should not be overlooked, and the amount and character of cultivation should be observed and carefully noted before reaching a final estimate as to condition of any crop.

(e) It is not necessary to discuss details with reference to plant diseases and insect pests, but it is highly important that the presence of either should be carefully studied and noted before fixing the estimate for any crop affected.

January 25, 1917.

DEGREE OF DEPENDENCE FOR CONDITION FIGURES UPON WRITTEN REPORTS.

By

Paul H. Kirk.

In any State in which crops are diversified, and there are no unusual changes from month to month on account of adverse weather conditions, insects, or other causes, at all times a great deal of dependence can, and should, be placed upon written reports. This, of course, is based on the assumption that your aids have been carefully selected and, on the whole, are known personally by you either directly or indirectly, so that the personal bias, if any, can be taken into consideration. In the Northwest there are unusual weather conditions that either make or ruin a crop in a few days; in other words, we have with us always the danger of rust, blight and early frosts to damage the crop, and timely rains, extremely favorable growing weather to make a crop. These unusual conditions change crop prospects very quickly, most for the worse, without giving any particular sign unless one has been out in the fields day by day and given very close study and observation to these particular conditions and their effect upon the crops. There are times when a calamity like rust or blight comes, as it were, like a thief in the night, and often its disastrous effect upon the crops is not apparent except by careful and painstaking examinations. Bearing in mind that I am talking primarily about unusual conditions, I am convinced that it is well nigh impossible to accurately estimate conditions without personal inspection of fields, and also forced by past experiences to admit that, in my opinion, the per cent of any aids, be they field, county or township, make a special inspection of fields before sending in a report, is too small, and therefore they are slow to detect abnormal conditions. Here, in my opinion, is one reason why too much dependence can not be placed upon written reports. I might here add that my aids are good, loyal men, composed of farmers, bankers, implement dealers, millers, elevator agents, general agents of the International Harvester Company, and officers of large transportation companies.

Another reason, it so seems to me, where too much dependence can not be placed in written reports in times of abnormal conditions is when the ranges of rust or blight has been like an insidious disease up to within a few days of the end of the month and then becomes apparent even to those who have not made close investigations earlier in the season - but who have sent reports previous to this time.

Again, reports made from the 25th to 28th of a month, and with a good deal of accuracy, and, ordinarily, correct, may on account of excessive rainfall, followed by hot, "muggy" weather, cool nights, causing either rust or blight, can, and I know have changed conditions from 10 to 15 points within a very few days after report was sent, so that the previous report mailed, though correct at the time, cannot be depended upon to reflect the actual conditions on the last day of the month.

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January 25, 1917.

FIELD SUMMARY SHEET 3122.
REPRESENTATIVE DISTRICT AVERAGES.

By

A. J. Surratt.

From my personal experience I believe that in order to secure representative district crop averages from travel, it is of first importance to make personal investigations or observations wherever possible. Secondly I aim to acquire a certain number of dependable and experienced reporters in each district. These men should be so located that practically all of them can be interviewed personally or by telephone in any one month if necessary or during critical periods when their judgment and experience will be of the most assistance to me.

In the selection of these men, I will state that while there are exceptions I prefer as a rule elderly men of the pioneer type if they can be obtained. Practically every district has certain outstanding successful pioneers of the progressive type who are actively engaged in farming or in business directly related to crop production.

These men who have run the gauntlet of all the state drawbacks, and with practically every dollar they own invested locally, unconsciously became shrewd observers as they developed with the community. They have acquired the faculty of knowing about what to expect from their territory under certain conditions. Their long experience has trained them in the use of comparison and gives them the courage of their convictions. Occasionally County Agricultural Agents or agents of private transportation, grain and live stock corporations prove to be valuable aids.

The extent of personal investigation and number of towns visited in a district necessary to secure a representative district average is governed by the relation of the crop inquiry to its importance in the district, also by unusual features that may exist such as extreme acreage changes, crop damage or other unusual features.

I aim to remain in the more important districts long enough to personally investigate in the fields representative areas and be sure that I know the trend of the honest opinions of several men in the county or district, who are rather publicly recognized as authority on agricultural changes or conditions.

Field investigations and observations give me my basis to work on in a county or district, and interviews or discussions with farmers, dealers, state or special crop experts or corporations, serve as the rounding out process to arrive at a conclusion.

This conclusion expressed in a figure represents my representative crop average, whether for town, county, district or state. This district average represents the average of the town or county averages influenced by the judgment of certain leading agricultural observers together with

my own general knowledge of the district based on rainfall and temperature or is necessary giving consideration to damage of any character.

I find Field Summary Sheet 3122 a more suitable recording blank for work on acreage and live stock, than for condition reports, owing to the fact that conditions will often change greatly between the time of inspection and the close of the month. However acreage reports are of much more importance than condition reports. In fact there are only a few months when I cannot use the record blank to advantage for inquiries on all schedules.

I at least like to have on file the monthly crop averages gathered in the field especially for the important crops for both review and comparative purposes.

In subsequent years when damage is somewhat similar it will often be of assistance to compare field records with a final of a certain month.

A detailed discussion of former damage periods is always noticeably interesting to agricultural men in general. It further demonstrates that you are keeping helpful records and know what you are talking about.

When crop condition figures gathered become practically worthless as in July 1916, I find it necessary to go back over the state again the same month during the closing two or three days and observe as far as possible the unusual changes and interview my most reliable aids.

In view of the fact that at best a Field Agent cannot possibly investigate in person more than a limited area in each section of the state in any one month. His personal reports recorded in Summary Sheet 3122 or other records for each district must be influenced more or less by the judgment of men who have demonstrated their ability as Agricultural observers. My final conclusion drawn from Summary Sheet 3122 represents a close study of the special value of these men together with an intimate knowledge of the strong and weak points of the state at any given period based on personal investigation.

January 25, 1917.

FIELD NOTES ON LOOSE-LEAF DIARY.

By

L. M. Harrison.

A most convenient and useful method of recording and preserving data collected by Field Agents is by the use of the loose-leaf diary. The book that I use most frequently is the small loose-leaf book supplied by the Bureau. It is the 3 x 5 size referred to by Doctor Jones a few days ago. Field notes that are intended for the permanent record are usually jotted down at the time the information is secured. This makes it unnecessary to re-write the notes later, and saves a great deal of time. If care is taken to have the subjects properly indexed and to use a separate leaflet for each subject, the data can be easily assembled and filed. In this way it is readily accessible for use at a later date. It is sometimes necessary to include on the same leaf notes pertaining to two or more closely related subjects. In that case the data can be filed under the general subject. For instance, a reference to both cattle and sheep written on the same leaflet can be filed under live stock. However, it is usually the better plan to treat each subject separately.

The information most suitable for a permanent record will readily suggest itself to the Field Agent. In many States the general statistical reports made by the various State Boards are well worth preserving. These include reports of the State Tax Commissions, State live-stock boards, etc. In a few States the special reports of the U. S. Reclamation Service and Indian Service are very valuable. When information of this kind is collected for a period of several years, it is usually transferred to the large loose-leaf diary. In either case, it is readily accessible for future reference.

While many other uses for the loose-leaf diary readily occur, enough has been said to indicate its value in preserving in a compact and accessible form data of a permanent nature.

The continued and careful use of the loose-leaf diary will eventually result in the building up of a ready reference library that will prove of increasing value from year to year.

No doubt many of you have adopted more suitable methods of preserving your field notes than some of the ways I have mentioned. Since I am very much interested in this subject, I would be pleased to learn the methods employed by other Field Agents.

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January 25, 1917.

WEATHER DATA.

By
Z. R. Pettet.

It goes without saying, that in the preparation of our report we must have all the germane material we can lay our hands on. As we saw yesterday the weather data of past years is of exceedingly great importance in helping us to get at the probable average. In the future we may hope that the connection of the weather with the yield will be established in all states for all crops. Until that is accomplished our own efforts may yield us some results. Considerable help is often found in comparing like years. This may lead us to conclusions similar in nature to that of the weather experts. For instance, if we take the little annual summary sheet of rainfall and temperatures for the past series of years and compare good and bad years with the respective yearly precipitation, certain features are often clearly discernable. In Georgia, for example, it is strikingly apparent that the heavy cotton years like 1911 and 1914, were years of deficient rainfall, while years like 1912 are low in yield, but high in precipitation.

The feature which impressed itself most upon me in this study, is that the law of averages as applied to the weather, does not help but rather leads us astray in unusual seasons. If we combine with the study of the average, the study of its exceptions and variations, we may hit upon some vital data. Particularly is this true of the weather at critical crop periods. When we have such an exceptional season, the value not only of past data, but the long range weather forecast is multiplied many times. It will enable us often times to discount damage far in advance of its actual appearance. Witness the cotton season of 1916. Up to July 1st the staple was holding its own fairly well. The continued rains following, as forecasted, altered our figures decidedly.

The ordinary weather forecasts, in contrast to the above, are of daily use. By their aid we can locate the portions of the state needing, or likely to need our attention. Important items such as frost, hail, wind, and flood damage are often mentioned. Running over the returns from the various observers gives us an especially good line on this. In some states the river stages are published, and this should give us a tip on possible flood.

When to our observation, and that of the correspondents, is added all the technical weather material, it seems that we should be able to point out to headquarters the things having special bearing on crop conditions. Particular emphasis must be placed on the weather for the following week which is often the principal point of the whole report. It is likely we all fail to drive this point home.

Considered in its broad sense, perhaps, we are all remiss in coordinating the weather and crop reports. Our crop reports are really for public use. To the ordinary reader we set up a barrier of figures he can not hurdle. True we supply the economic or scientific need, and to

a certain extent we supply the commercial requirements of buyers, handlers and manufacturers, but the ordinary producer misses entirely, or receives late the very material we are getting for him. And as mentioned, this reaches him in a form he cannot assimilate. He needs it in primer form.

This brings us to the journalistic, news and educational value of the crop report. I hold that here we are weak. Our reports are on a par or superior in importance and news value to the weather, bearing to it the same relation that the effect does to the cause. Consequently the crop news should be published with the weather news on an equal basis. As it is we get a few inches of space once or twice a month in the metropolitan dailies only. (I trust Mr. Paxton will push this point to its proper conclusion.)

And now to return to our own more particular business, we do not give our own reporters much weather news at the time or in the form they can use it, and they reciprocate in kind. Hence, there are comparatively few remarks and comments on weather influence. In other words, if we desire good seasonable weather comments from our aids, we must set them a good example and impress upon them the relationship of crop and weather, and the necessity of touching upon this in their regular reports.

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January 25, 1917.

COMMERCIAL REPORTS.

By
J. E. Rickards.

Those of you who are located in the old States, where well tried-out methods of State Government are operative, have little idea, perhaps, of the difficulties which the newer Western States have in organizing a reliable working method for collecting dependable figures on acreage and yield of crops. It frequently happens that in less than a decade the acreage to one or more crops increases or decreases, as the case may be, from 30% to 50%. In many of your States such a change is unheard of.

Inasmuch as the returns made by the assessors form the basis upon which taxation is fixed for State and municipal maintenance, one would suppose their figures should be the last word. But, as published, they are utterly worthless for our purposes. One must have some familiarity with the law by which they are guided. Their figures, for illustration, on live stock, entirely ignore many thousands which may be exempt under the State law, not having reached the taxable age, but which we are supposed to consider in our estimates. The only real value that I have found in them is in taking them for a period of years as showing the trend toward an increase or a decrease.

On the other hand, I have found the reports of our State Horticultural Board to be valuable and helpful. Its work, as its name indicates, is confined to the fruit industry, both deciduous and citrus; and to be effective, its figures must be as nearly accurate as is possible to get them.

I understand "State Associations" as used here to mean, Commercial Associations formed for the purpose of fostering the interests of the crop designated by the name given it - such as, "The Raisin Growers' Association", "The Wine Growers' Association". I have found these to be of much service. These Associations, after methods of their own, do get reasonably close to acreage and yields of their respective crops. And by keeping in touch with them one can keep in closer touch respecting "conditions" than when depending upon the few growers whom we may have on our list of reporters. However, it is found that these Associations, after all, have to resort to estimates, for not one of them, that I am familiar with, represents all of the growers, having only from sixty to eighty per cent of them signed up for cooperation. Really, I have been surprised to find that the best and most successful organization, of the large number that we have, has no record of the acreage or number of bearing trees of the fruit which they handle: The General Manager of said Organization having recently said to me, "We have made several attempts to tabulate that information, but the yield has every time 'pied' our figures."

The next head of my subject is Newspapers. From them I get very little help. In perhaps most of the far Western States, the local paper is a "booster" (I do not use the term offensively) - a booster for its patronizing territory. Favorable conditions are too frequently magnified, while unfavorable information is withheld. It is my judgment

that "Trade Journals", per se, would prove invaluable to us. The reports in them are more reliable, as they have more time and better opportunities for getting actual facts. The Field Agent can not afford to subscribe for these publications. I hope I will not overstep the proprieties in suggesting that the Bureau should furnish to the Field Agent a few of these Journals.

The concluding heading of my subject is "Large Firms". I find these of more help to me than any one of the other three sources for dependable information, indeed of more service than the three combined; although the "Trade Journals," if I could afford to take them, would stand first. My experience is that firms that specialize on some one crop have men in the field gathering information respecting acreage, condition, and yield. They maintain a system of their own for collecting the very information we need. It is by cultivating these people that I get figures that are helpful to me. Of course one must have other information in order to be able to judge whether or not the firm is playing the game of a "bull" or a "bear"; or, in other words, is playing the game on the square with you. Or, putting it, perhaps more politely, one must judge whether your informant is interested in raising or lowering the price of the product in which he deals, as showing his bias. In instances I have found the figures given me were different from those given out for publication; and then it was for me to judge if there was a motive behind the published figures.

January 25, 1917.

PAST RECORDS.

By

W. F. Callander.

I will discuss the last half of my subject first, because I have given more attention to state records than I have to district records. One of the first pieces of office work of any size which I undertook after being appointed a field agent was to tabulate all of the available data regarding the crops grown in Wisconsin from the Crop Reports of the Bureau as far back as 1899 when the next to the last census was taken. These tabulations I made upon small sheets which would fit into a pocket memorandum book (exhibit book) in order that I might have it with me all the time in the field. In this tabulation I showed the relative acreage, that is, the acreage compared to the previous year, the total preliminary acreage and the final estimate of acreage, the percentage of acreage abandoned in the case of field sown crops, the acreage reported by the assessors, the condition from month to month, average yield, etc. In my work I have found these records very valuable, especially when considered in connection with the weather records, which I have also tabulated for a number of years back. An examination of the relation between rainfall and crop conditions and yields shows a marked correlation and by having these two records side by side and knowing the rainfall for a given month, a number of times I have been able to estimate the condition quite closely -- experimentally of course. One of the first things I do at the beginning of each month is to tabulate the weather reports from the various stations in order to determine the average rainfall and mean temperature for the State. In addition to this record, the Weather Bureau Office at Milwaukee during last season furnished me at the beginning of every month the record of rainfall by weeks at about forty of the cooperative weather Bureau Stations as well as at the regular stations. These records were of great help in interpreting reports which showed unusual conditions.

For the agent rather new at the business of crop estimating, I consider these records for the State as almost invaluable. With them as a guide he is able to form a more intelligent estimate for they furnish a kind of guide or Standard to judge by, and they keep him from getting off the track too far. I can see where, after an agent has spent several years in a State and has become perfectly familiar with crop conditions, he might not need these past records to the same extent that a new man does.

What I have said about state records is equally true with respect to district records, if not more so, for when you are dealing with a district you have, generally speaking, more homogenous soil and climatic conditions and for purposes of comparison within the district, district averages should be better than those for a whole State.

Each month after having taken the straight average for a district, and checking the average against information, I have secured from other sources, especially personal inspections, I compare it with the average for previous months of the year before finally setting down the modified average. So far I have not tabulated the district records, using the working sheets or rather

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summary sheet for purposes of comparison. I believe, however, that it would be very helpful to tabulate these records, not only for the past months of the same season, but for previous years.

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January 25, 1917.

REPORTS BY SPECIAL LISTS.

By

J. S. Dennee.

It is the experience of the Louisiana field agent that reports emanating from special correspondents on a carefully contrived list are of far greater value to him in the preparation of his reports to the bureau than data returned by any general correspondent. It seems rational enough, I believe, that growers selected because of their familiarity with a given crop and their following that crop perhaps to the exclusion of all others, in other words make it their leader or money crop, are in a better position to render reliable data on that crop than those correspondents who are engaged with several crops in a more or less indifferent way.

Louisiana being a state planted largely to big staple crops, I have found that the maintenance of special lists is imperative and that better results are achieved from correspondents specially selected because they are engaged in growing those particular crops. Satisfactory data is rarely obtainable on the staple crops from general lists, and if the opinions of the general correspondents are taken seriously by the field agent he will not infrequently find himself led astray, because the data returned by the general correspondent is often of the "canned" variety. To achieve the results we desire, and to place ourselves on the safe side in arriving at our conclusions on estimates, I believe it is best to pick one's correspondents with especial regard to the crop or crops which those particular correspondents are growing; and the field agent having satisfied himself of the greater value of the men he has specially selected in that way should at once place their names on a specially prepared list, and give greater weight to their opinions.

That is the practice in the office of the Louisiana field agent. For example, in making up his report on rice he studiously avoids opinions rendered in a general way by correspondents in sugar and corn and cotton localities where experience has taught him that rice is not to be reckoned with there as a material crop. And the same may be said with respect to his manner of handling the other large staples.

I believe further that the greatest weight should attach to the opinions rendered by the special lists for the primal reason, if for no other, that they are special opinions. In the business world nowadays specializing is what counts to the detriment and disadvantage of generalizing; and I can see no good reason from the field agent's viewpoint why this rule should not hold equally good in the crop reporting world. In the preparation of my reports to the bureau, I invariably give preferential consideration and weight to the opinions of my special correspondents on given crops. I have learned in the school of experience that it is best to do so.

No. 64-A
January 25, 1917.

EDITING SCHEDULES.

By
A. E. Anderson.

Editing schedules is a part of the field agent's work which requires thought, care, and judgment because it is a step in the direction of greater accuracy. There are several factors to be considered, among which are the field agent's personal knowledge, the aid, the locality, and in many cases the weather.

As a rule any one schedule will not vary much from the average of all of the same county but occasionally one will appear to be beyond reasonable limits. The cause of this variation may be attributed to one or several things such as bias, misunderstanding, pessimistic or optimistic mood of the aid, and the tendency to extremes which is increased by exceptionally favorable or unfavorable conditions. It is quite difficult to overcome bias. Perhaps the best way is to drop the aid who has such tendencies.

Misunderstanding of the inquiry is often due to failure to follow the printed directions on the schedule. It is not difficult for the agent to detect and correct this.

Aids can be classified as being either optimistic, neutral or average, or pessimistic. If we could have the same proportion of each class, editing would not be necessary, but as a rule we have a greater per cent of pessimists. The best method is to change any figures which are too much above or below the general average in such a manner as to preserve the tendency either up or down but to keep it within reasonable limits.

The reports of some aids indicate they are unduly influenced by weather conditions. That is they report figures higher than justified under very favorable conditions, while under very unfavorable conditions we get the other extreme. Under these circumstances the best recourse is the field agent's personal knowledge. If it happens he has not recently visited the county in question his knowledge or acquaintance with the aid will be of value for best results. The ideal aid is one whose reports require no editing. Generally he is among those who report regularly and takes pride and interest in the work. One hundred reports from this class of aids is worth more than the returns of three hundred aids who are negligent and uninterested. While it is impossible for an agent to get in personal touch with all his aids, he should endeavor to meet and get acquainted with at least three of his best aids in each county. The average of the returns from these three aids may be used as a basis for editing the reports from that county in case the agent's information is not up to date.

All schedules from a county should be grouped together before editing, and if there appears to be too much variation they should be considered as a whole, or unit. Comments should be noted as they generally

give satisfactory explanation. The total number of schedules edited at a time should be limited to twenty or twenty-five, depending somewhat upon the total number from a district.

There is often a tendency for aids to underestimate acreages and live stock to such an extent that editing does not seem practical except to reject minimum extremes. It seems that the figures are more valuable to the field agent if the editing is limited to the rejection of minimum figures as the results give valuable comparisons even if underestimated. For example, if the corn acreage reported this year was 98% and last year 95%, it would indicate a gain of 3% or a loss of 3% if the reports were reversed.

The agent should have a maximum limit for condition figures. An estimate more than 25% above normal should be reduced if not rejected, especially if the returns are limited. While a condition of 125% may be possible for a single field, the chances for high condition figures diminish rapidly as the limits of the area are extended. There need not be such great hesitancy to accept a condition or yield figure far below normal because the frequency for the minimum extreme is much greater. One of the valuable guides for editing condition figures is the daily weather report from one or more stations in each county.

In conclusion will state that it is not best to edit too severely, and that it should be limited to a change in the extreme figures such as will preserve the opinion of the aid, but keep it within reasonable limits. Editing should be uniform from month to month.

COMPUTATIONS.

USE OF MACHINES. COMPUTING TABLES. ETC.

BY

W. F. Callander.

January 25, 1917.

When I first started in the field agent work the tabulation of the schedules at the beginning of every month was almost a nightmare, and I found myself pretty well tired out by the time I had the report completed each month. For the past year through the courtesy of the Dean of the Wisconsin College of Agriculture I have had the use of a Dalton adding machine. In order to use the adding machine effectively, I found it necessary to list the schedules from field aids on sheets before making the additions. While the listing of these schedules is somewhat slow, I am fully repaid for the trouble since I have the records of the returns from each county in permanent form, arranged by county. In the heaviest months I have found that by the use of the adding machine 400 schedules or more from the nine districts can be added and checked in about three and one-half hours. The most satisfactory thing about the use of an adding machine is that when the work is done one knows that it is correct if the figures have been put down correctly, and the work of checking is easily done.

About eight months ago I started the use of the slide rule in making the computations of averages, that is for dividing the sum of the reports by the number of reports. I first used a twenty-inch slide rule which was loaned to me by the Forest Products Laboratory, but a few months ago I ran across a small circular slide rule, called an omnimetre, sold by Dugene Dietzen Company, which was being used by the College of Agriculture, and found that after practising for a while I could make the computations more rapidly with it than with the regular slide rule. The Bureau was kind enough to purchase one of these rules for me several months ago. It can be read correctly to three places and the fourth place can be closely approximated. I should not want to do without it. The tabulation and computation of reports is made much easier by the foregoing devices.

January 25, 1917.

COMPUTING TABLE.

By

Verne H. Church.

In making the necessary computations in connection with the monthly crop report, I have found it expedient to utilize a multiplying and dividing table. The one which I prepared is nothing more nor less than an expansion of the ordinary multiplication table. The figures were typewritten on white tissue paper and then mounted on both sides of a sheet of heavy press board about 15 by 17 inches in size. A coat of shellac prevents the surface from being easily soiled or worn, and makes the figures stand out boldly and distinctly.

The numbers across the top of the table begin at 11 and extend to 66, and those on the left hand margin extend from 20 to 99. The top numbers should extend as high as the maximum number of reports received from any district, and this was the case when I prepared the table. The number of reports later increased, and if I were to compile another I would have the numbers extend to 99 across the top as well as on the left-hand margin.

In multiplication, the product of any one of the top numbers and any side number is found at the intersection of the vertical line through the former and the horizontal line through the latter. Division is merely a reversal of the process. By means of this table, the necessary divisions for obtaining district averages and also the multiplications performed in obtaining weighted averages can be handled rapidly and accurately.

As most of the ordinary calculations deal with numbers of two figures only, no mental computations are necessary in using the table, and I would estimate that it saves 75 to 85% of the time required to do this work by the ordinary method. Where quotients consist of three or more figures, either whole numbers or decimals, the table is equally applicable, but the percentage of time saved is slightly less because some

mental calculations must be used in connection with it.

In order that all agents may be provided with such a table in a more convenient form and size, I would suggest that a supply be printed and distributed throughout the Bureau.

COMMENTS.

GENERAL FORM

January 25, 1917.

By

J. J. Darg.

In addition to the reports made to the Bureau of Crop Estimates, the Field Agent is expected to supplement such reports by concise written comments or explanatory notes, which will explain and justify his figures.

Separate comments should be made for each speculative crop reported upon, and for any other that is considered important that month or concerning which, conditions are unusual. The remaining crops should be considered and commented upon by groups under their appropriate headings.

Comments on speculative crops should be mailed with the speculative crop in Special A envelope, and comments for other than speculative crops should accompany the nonspeculative report and should be mailed in Special B envelope.

Suppose an agent reports the condition of wheat at 70 per cent of normal and sends no note of explanation for this low condition, and the Bureau from its other sources of information gets a condition of 80 and 85, while the Crop Reporting Board generally gives more weight to the figures sent in by its agents when they are backed up by proper explanatory notes, the Board, in this instance has no other alternative but to ignore entirely the agent's figures, simply because he has omitted to send comments on this crop; this will show the importance of explanatory notes accompanying each crop.

Comments should embrace weather conditions whether they be adverse or seasonable to crops; they should also include depredations by insects and any other causes that effect crops. The extent of detail should be complete but it need not be cumbersome. All that is required is a brief, concise statement backing up his figures sent to the Bureau as being an honest compilation of the data gathered through his own personal observation and investigation and from that of his aids.

The term average crop, meaning less than a full crop but a little better than the real average is sometimes used by the farmer to express his views of his crops, but of late years the farmer has come to know that the Bureau's normal crop is what he is pleased to call a full crop, there is practically no such thing as an average crop because of the effect on the average of extremely low or high yields in exceptionable seasons.

The normal crop or standard adopted by the Bureau of Crop Estimates is the farmer's "full" crop which he expects to harvest, or it is a crop that from the time it was planted to the time it was harvested, weather conditions have been favorable and has suffered no setback from insects or other injurious causes.

The term "usual" crop or customary crop is that which is generally sown or planted and may be reckoned by taking the average of crops for three or four years back; this usual crop is a good means of comparison with other years.

Local color -- I take this to mean local interest. I find everywhere in my travel that the local interest taken in the reports published by the Bureau of Crop Estimates on acreage and condition is one hundred fold more at the present time than it was from five to ten years ago; the farmer has a better knowledge of the benefit he receives, directly and indirectly from the Government Reports and while once in awhile I run across a man who is a chronic kicker, I am more and more convinced that the majority of farmers and other business men consider it to be to their advantage to co-operate with the agents of the Bureau and make the report what it is, an honest representation of acreage and production of every crop reported upon.

ARTICLES FOR PUBLICATION.

By

E. C. Paxton.

January 25, 1917.

Without any introductory remarks, whatever, I wish to say at the outset, that my talk on the subject of "Articles for Publication" will cover but two phases: first, the purpose of such articles: second, the character of such articles.

The primary purpose of such an article as I conceive it, is to enliven the statistics published in the crop report. As my good friend, Mr. Alciatore, of Reno Weather Bureau Station stated to Dr. Jones and myself last March, "The crop report needs to be made more 'human'." Whether Mr. Alciatore used the proper word or not is beside the question. The picture he called up in imagination was that of the crop report being a sort of mathematical steam roller that crushed the average man's mental faculties without his realizing just how or why the thing was accomplished. What the average man read the crop report for was a feast of news - what he actually found was a mathematical "Irish stew" that his brain did not digest, let alone assimilate. As a reporter on a Salt Lake Daily put it to me, "Mere statistics, to the average reader, does not constitute news, but, statistics with an accompanying interpretative analysis, giving cause and effect, is vital news of the first magnitude." The newspaper reader is either hurried or lazy. He may be able to deduce cause and effect from a statistical table, but he either does not or will not. He wants it done for him. He wants neither the whole milk or the milk ticket - what he wants is the cream already skimmed and pre-digested. To tabulate it for him that Utah will this year produce three million bushels of potatoes

means nothing. To accompany the statistic with the statement that this is a million bushels more than last year's crop on a smaller acreage and that the increased yield is due to care in selection of seed, to crop rotation, and to better practice in irrigation, and he wakes up and takes notice. A tabular statement that alfalfa on June 1st promises to yield sixty per cent of a normal crop may induce attention, but his attention is held and his interest aroused when he reads about the ravages of frost and weevil. Statistics must be made to wriggle with life or else seek repose in the cold sarcophagus of oblivion.

Secondly: the purpose of the articles for publication is to introduce items not mentioned in the brief crop report. For illustration: brief mention of the condition of the Summer or Winter range and of live stock on the range; the extent of frost damage to truck, canning or fruit crops at a time prior to our regular reports on those subjects; the prospective water supply for irrigation purposes; etc. Such items are as varied as the season, and many will suggest themselves to your mind. They need no further elaboration.

Thirdly: the purpose of the articles for publication is to add local color. The average condition of hay for the State may be only eighty per cent, but in one section it may be exceptionally good, and in another very poor for specified reasons. Serious local damage may have been caused by flood due to the breaking of an irrigation dam at Hatch Wash. Grasshoppers menace the alfalfa crop at La Junta. Rust has made its appearance in the wheat fields in Blank County because of excessive rains. Hessian Fly or chinch bugs are numerous in Cowley County. There is always a wide field for comment along this line. The prime consideration is in choosing only those items that are really worth while. Caution is necessary against over-doing it. A happy choice of such news will, I believe, cause the crop report to be more universally read. It also enhances the impression that the Field Agent is alive to agricultural conditions in every corner of his State.

And this brings me to the fourth and last purpose I had in mind. That is, that the signed article for publication becomes a means whereby both the Bureau and the Field Agent may be favorably advertised as the best authority in the State on agricultural data and development. The Field Agent becomes a sort of Press Agent for himself and the Bureau of Crop Estimates. It is a real test of the Agent's metal and will show up just how much is pure gold and how much is alloy. In his article he must use discretion, to guard against back fire and worst of all ridicule. No statement should be made that is not capable of unassailable defence. Truth should be his sword and accuracy his shield. In writing for publication the Agent should always feel that the reputation, even the very life, both of himself and the Bureau is going into the balance. It is hard for the Bureau and harder for the Field Agent to live down a mis-statement that brings disrepute or ridicule.

Enough for the purpose - I come now to the character of the article. I have already touched on this subject incidentally, but I wish to bring to your notice now, for emphasis, three characteristics of composition that seem to me very essential. These are, INTEREST, BREVITY and ACCURACY. I name them in this order from the readers stand point. From the Bureau's

stand point, they should, perhaps, be named in reverse order. First, the article should attract and hold attention through interest. As to what is interesting to the reader, most any good Rhetoric will guide you. I mention three things that are always interesting - the unusual or strange - that which is striking because of magnitude - and that which brings home the personal touch, or appeals to self interest. Again, brevity is essential both because you are writing for a hurried or lazy reader and because the space the newspaper will accord you is very limited. Lastly, accuracy is essential because on your statements hang the good reputation of the Bureau and yourself.

I will not take further time - I have tried to be suggestive rather than encyclopedic. In conclusion I only wish to add that all my reference has been to writing (I emphasize writing) for publication. Rarely if ever do I think the Agent should allow himself to be interviewed orally for publication. A news paper reporter claims to love the truth, but I affirm that he never loves it naked - he wants to dress it up. If my turth needs a gown to enhance its charms I prefer to be the dress-maker. A verbal interview always has the menace of mis-quotation malin-gering in the middle distance for future misfortune.

No. 68. METHODS OF ASCERTAINING NUMBERS OF LIVE STOCK.
Jan. 25, 1917.

By

E. C. Paxton.

Because of the close relation existing between numbers of live stock, meat supply, and the high cost of living, the question of numbers of livestock seems to come in for headlines oftener than any other subject among our reports, unless it be wheat. The difficulties of livestock estimates seem also to keep pace with their importance. The obstacles to overcome are enhanced above those encountered in other estimates for many reasons. Livestock is always subject to a direct tax in the state and we have a bias entering in that is not applicable to grain crops. In our inter-mountain region we have also to deal with migration and feeding in transit, and with clean-ups and shifts incidental to shortage in production of forage. As all these difficulties are to be dealt with later this afternoon I will not treat of them here.

I have in the course of three years' study arrived at a few conclusions as to what methods of ascertaining numbers of livestock apply best in my own states. I have and shall continue to use average estimates of increase or decrease in numbers as my basis of revision each year. All other methods of ascertaining numbers are used as a check on this method. The first essential in the percentage method is, however, the reliability of and the Agent's confidence in the previous estimates or the base from which he works. Where reliable checks have convinced me that the census basis and estimates of former years are at fault, I have marshalled my evidence and bombarded the Crop Board with my utmost eloquence to bring about what I considered a fair revision. Confidence in the base being once established, simplicity of procedure results, but necessity for continued checks remains.

Before I go into the subject of checks, what they are, and how they work, I wish to point out that I have found it very helpful to maintain a special list of aids on livestock, whom I address only in April and January. They are men only incidentally interested in crops other than livestock, and would not report at other times of the year. I am continually adding to this list and all the year round I seek the acquaintance and friendship of such aids. The Semi-annual Conference of the Mormon Church and the Annual Meetings of the Utah and National Woolgrowers have afforded me a harvest time for reaping such friendships and gleanings stray bits of information. Similar opportunities must certainly be afforded in almost every state. I suggest that it might be well worth while for Field Agents in the Western section, especially those close by, to attend a National Woolgrowers' Convention in Salt Lake for the purpose of widening their acquaintance among stock men and for the educational features also.

One of the first checks that I discovered and used was that of determining sheep numbers from wool production. I figured that all our Western wool had to go to market in car lots and that total wool shipments in any state ought to approximate total production of wool. Total production of wool divided by weight per fleece then ought to give the number of sheep shorn. This would, of course, be spring numbers and not January first numbers.

In my states, where winter feeding of lambs is almost negligible, these numbers closely correspond. There would undoubtedly be a considerable difference in some states - Colorado for instance. But even in such case the shipments of sheep to market between January and shearing could be added as a later check. I have found no difficulty in obtaining from the railroads the shipments of wool. The shipments of sheep are harder to get, but the obstacles are not at all insurmountable. I believe that any Field Agent who has not used this check on sheep will find it very practical and advantageous.

The use of the wool check for sheep aroused my imagination and I conceived the idea of getting total shipments of each class of live stock, then of determining what per cent of his flock or herd the stock man disposed of each year on an average. From this, to establish a multiplication figure, which applied to the shipments would produce the total number of stock horses or cattle or sheep in the state. I tried this scheme out first in Nevada in 1914 and met with failure, altho the study put upon the subject was fruitful. I neglected the first year to get the point of origin and destination for the live stock shipments, and hence was unable to segregate the interstate shipments from the intrastate shipments, which is very essential, because stock are so frequently transported from one range to another by rail. The plan has never yet brought me any really practical results, and I am of the opinion that it never will be of much use to me except for other cattle. After much inquiry I determined upon 4.9 as the proper multiplication figure for range cattle in my district. This figure is the result of several hundred competent estimates obtained from cattle men in Utah and Nevada.

Another check that I find particularly useful in Utah is the range permits. Where so much of the range is in forest reserves as in the Western states, most of the cattle, horses and sheep, must have range privilege during the summer. This check ought to be of much benefit in all of the mountain states.

At times special checks offer themselves. One such that I have found in recent years in Utah is on sheep. Here the State Sheep Commission one spring, in the course of inspection, counted all the sheep through the shearing pens. Such a check is very enlightening and invaluable to the Field Agent, because reliable. I am always on the lookout for such a check.

I this fall adopted a device similar to the use of check field in grain estimates, that I am hopeful will prove useful. Along a certain stretch of railroad between two towns as I ride through, I try to count all the cattle on one side of the track going one direction and on the other side going the other way. The count is to be made each year about the same time between the same points, and record kept. As soon as I have two counts for comparison, it will furnish a check directly on the per cent of increase or decrease. It will, of course, have its limitations and will have to be considered in the light of other information. Difficulty in counting results when the train goes too fast or the cattle are too numerous. Where the cattle are bunched, I have had to estimate numbers in an

individual field. I have chosen my check area along a road where the train always runs slowly. Because of the paucity of rail service in my district, I practically always find it necessary to double back over my route. In many states this would not seem desirable.

I would prefer that the remainder of the time allotted to me should be taken up in a discussion of the checks and methods I have suggested and in the presentation of methods used by other Field Agents.

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No. 69-70a

January 25, 1917.

CAUSES OF UNDERSTATEMENT.

By

P. H. Kirk.

While it is in nearly all cases found that reporters underestimate live stock, the reasons why this is done is not so apparent. However, there are several reasons which I think cause the reporter to underestimate. Heavy marketing of live stock does not necessarily mean the depletion of stock, but rather that there have been a good surplus back on farms. Again, live stock may, on account of weather or crops, be marketed earlier or in a few months instead of during a whole year. Buyers of certain classes of live stock, such as war horses, may have estimate on that particular class of stock, and think because there have been heavy shipments on the class of stock he has been buying that all classes are short, whereas other classes may be increasing, or have no particular sale. Again, farmers I think are not yet fully convinced that the estimates they send in may in some mysterious manner find their way into assessors hands, and, therefore, are just the least bit inclined to send in low reports. Again, the final and most important reason is that so few people really are well enough acquainted with actual conditions to give an accurate report. Live stock reports should be given special attention and consideration by all field men.

January 25, 1917.

SOURCES OF INFORMATION WHICH ARE OF GREATEST
ASSISTANCE IN OBTAINING RELIABLE DATA
FOR ESTIMATING NUMBERS OF LIVE STOCK.

By

F. S. Pinney.

The following are classes or sources, which in my territory, prove very satisfactory as mediums through which to ascertain the approximate live stock situation. Live stock commission men situated at the leading markets tributary to my territory; live stock agents representing railroad companies, some of whom are located at the leading live stock markets, others at Division points, or at the General Headquarters of their road; Division Superintendents of Railroads; Division Freight Agents; Local Freight Agents at competitive points; Elevator men in stock feeding territories; Veterinary Surgeons, both local and State; County Assessors and Township, if possible; Bankers, especially Bank Cashiers in small towns, located in heavy live stock feeding territories, and live stock Auctioneers. Agricultural implement men, especially salesmen, seem to be in a pretty good position to perceive any change in the live stock situation, as it can readily be seen that any important or prominent change in the class of farming from Live Stock Farming to Grain Farming, would certainly be recognized by them, as in the event of any material change their sales would certainly be affected.

I believe I cannot say too much in favor of constant inquiry relating to live stock conditions while traveling throughout the entire year. Close attention to this phase of our work will not only eventually prove interesting as well as beneficial, but will sooner or later develop or advance you into that state of medium, which will prove more or less phenomenal in its response to important changes. In other words, I believe it possible for a Field Agent, if not burdened with too many subjects for investigation, to become finally so thoroughly acquainted with his territory, that he will almost intuitively recognize, or become, during his travels, sensitive to important changes in the live stock situation.

I believe a field man can, with confidence, place considerable dependence upon the opinion of reliable Veterinary Surgeons, as they are not only familiar with diseases affecting numbers, but are prone to recognize and remember climatic conditions, more or less fatal to stock through exposure.

The study of prices of live stock for the year or two preceding the date for which the estimate of numbers is made, especially if any class or classes of live stock were inconsistently low in comparison with feed values, would be a source which should bear some investigation, as such market conditions tend to affect stock raising, at least temporarily.

When labor is well employed throughout the country much more meat is consumed at large centers and the demand for meat under such favorable conditions being steady, the tendency to raise more cattle, hogs and sheep is often increased to a greater degree than the estimates of our correspondents indicate.

This phase requires close study. Also, during times of unemployment the tendency to go out of stock raising is more or less indicated, but the tendency to decrease under such unfavorable conditions is not to such a degree, in my opinion, as is the tendency to increase under growing favorable conditions.

There are now in Iowa approximately twenty-two county agents, most of whom are graduates of the Agricultural College at Ames, Iowa. It is hardly necessary to elaborate upon the qualifications of these men. Most of the county agents whom I know are furnished with automobiles for the purpose of covering their county and in time are enabled to meet a large majority of the farmers. They become exceptionally well informed as to crop and live stock conditions in their counties and any information obtained from this source can be relied upon.

In most communities any Banker can put you in touch with one or more cattle buyers and the consensus of opinion of quite a number of such men well distributed throughout each district will afford valuable information in reflecting the trend of live stock members.

No. 71-72 a
January 25, 1917.

MIGRATORY STOCK.

By
F. L. KENT.

Summer grazing of stock within the National Forest Reserves and on other public lands is a very important phase of live stock management in most of the states west of the Mississippi River.

The National Forest Act was passed in 1891, and its administration delegated to the Department of the Interior until 1905, at which time it was turned over to the Department of Agriculture. The Secretary of Agriculture reports that in 1905 there were 692,000 cattle and horses, and 1,514,000 sheep and goats, on about 85,000,000 acres. Ten years later, in 1915, there were grazed under pay permits, 1,724,000 cattle and horses, and 7,300,000 sheep and goats. This increase in numbers is due in part to increase in the Forest area, but the Secretary states that, "the number of animals now sustained in proportion to the area of the Forests, is 50 per cent greater than it was 10 years ago." Forestry officials are of the opinion that the grazing efficiency of the Forests may be further increased to the extent of 15 to 25 per cent. The total area now included in National Forests is approximately 150,000,000 acres, on about two thirds of which there is more or less grazing. There are also about 300,000,000 acres in public grazing lands outside the forests.

In 1911 Congress passed the Weeks Forestry Law, providing for the purchase of lands in the Appalachian and White Mountains, and elsewhere for the purpose of establishing Forest Reserves, primarily for the purpose of regulating the flow of the larger streams, and to be administered along the same general lines as the western Reserves. Under this act there have already been approved for purchase about 1,500,000 acres at an average price per acre of \$5.22.

Utah leads in the number of grazing permits issued, 8,272, which is more than one-fourth of the total number for the whole country, 30,610. But Idaho leads in the number of head of stock provided for, with only 2,676 permittees, or less than one-third of the number in Utah. The Idaho Forest Reserve stock exceeds that of Utah by about 25 per cent.

In estimating range carrying capacity for stock it is assumed that the requirements of cattle and horses are equal per head, also sheep and goats. But, one cow is allowed as much as four sheep.

In the two states just considered, Utah and Idaho, the Forest Reserve stock represents for Utah 36 per cent and for Idaho, 34 per cent of the total estimated number in each of these states. For the entire Mountain division, which is estimated to contain about 15 per cent of the total live stock of the United States, exclusive of swine, the percentage grazed on Forest Reserves is 21 per cent. In the Pacific Coast division the percentage of Reserve grazed stock is about 12 per cent of the total in that division.

In the United States as a whole, the percentage of stock grazed in Forest Reserves is about 3.8 per cent of the total number.

Comparatively little of the Forest Reserve stock remains on the range during the winter, hence must be moved twice yearly between winter quarters and the public range. Some of the sheep men in the state of Oregon report driving their stock a distance of about 200 miles, which is probably near the maximum drive for sheep. Where feasible, sheep are frequently shipped part of the distance they must be moved, and when shipped, a distance of more than 200 miles is often traveled. Forestry officials state that during the season of 1916, about 600 carloads of sheep in the state of Washington, and about 100 carloads in Oregon were moved by rail on their journey from the home range to the National Forest range.

Sheep are usually allowed to enter the Reserves about July 1st, and they remain about four months. Cattle and horses are permitted to go in about May 1st on the average, and usually remain in about six months. Forestry officials estimate that there is a mortality of about one per cent with the stock while within the reserves. This loss is mainly due to attacks of predatory animals, and to a lesser extent to death from eating poisonous plants. There is also some loss in driving to and from the Reserves, particularly in the case of sheep. Feed is usually short in the territory traveled, and the loss in condition on some of the long drives is a very considerable item.

The public grazing lands outside of the Forest Reserves are about double the area of the Reserves, and for an equal area probably have on the average, about double the stock carrying capacity of the Reserve lands, or, in the aggregate, about four times the capacity of the Reserves. Privately owned ranges to which stock are moved for summer feeding, probably have a capacity at least equal to that of the Reserves. The Reserves, therefore, may be conservatively estimated as carrying about one-sixth of the migratory stock of the entire country. We have determined that the Forest Reserve grazed stock amounts to about 3.8 per cent of the whole, therefore it seems probable that not less than 22.5 per cent of the entire live stock of the United States, exclusive of swine, is grazed elsewhere than on the home range for a part of each year, and therefore may be called "migratory stock".

January 25, 1917.

FEEDERS.

By

W. W. Putnam.

The history of the extensive feeder business is largely that of the last thirty years, and especially as it concerns one of the three important branches of the live stock business, that of the sheep business. Of the three classes of live stock, hogs are more largely finished upon the farm and in the states in which they are grown, while cattle and sheep have been subject to great changes in location, being shipped from state to state to fill the requirements of those who are to prepare them for the killers.

Speaking particularly of Colorado, the state with which I am most familiar, cattle that are fed in the state are of comparatively small numbers and make very little difference in the estimates of the number of cattle within the state on January first. On the other hand, this class of stock is important in the corn crop states of Kansas, Nebraska, Iowa and Illinois, and to be spoken of more fully by others. Sheep are fed in large numbers in our state, varying greatly from year to year, and this tends to complicate the matter of arriving at proper figures.

In the central and south central states the lamb crop is largely fed and marketed long before the time of our enumeration, while in Colorado and other adjacent western states the sheep are handled in large herds upon ranges. The lambs are born later in the season usually April and May, and are ready for the market as killers or feeders about the first of October, their condition depending upon the range upon which they have been held, whether upon the plains under short grass and uncomfortable heat conditions or ranged in the mountains where the feed is more succulent and the temperatures more congenial.

Gradually there has been a change in the marketing of these lambs from year to year depending upon their condition, price and demand. In later years if the season has been favorable quite a large per cent goes directly from the ranges to the primary markets for slaughter. The per cent of those that are marketed in this way varies greatly. Last year it was estimated that about 60 per cent from Colorado were fed in feed lots and only about 40 per cent went directly to market while this year the conditions in Colorado were such that nearly ninety per cent as killers and only about 10 per cent went into the feed lots. The total number of sheep and lambs, more particularly lambs, required for the feed lots in our state varies from year to year, only as the amount of available feed varies. Consequently in a year like this the supply of lambs for the feed lots has been drawn very largely from the adjoining states, New Mexico, Wyoming and Utah with a few from Arizona, Idaho and Montana, so in the enumeration of our sheep population it is necessary for us to consider the stock in two classes, those that are termed stock sheep and are held primarily upon the ranges as breeding stock and those that are in the feed lots on January first. The census of 1910 apparently included part of the feeder stock. Since 1910 our stock sheep have steadily decreased until the past year, due to great changes in range conditions caused by development of the eastern portion of the state as dry farming territory. Probably seventy-five per cent of the sheep of that portion of the state have been sent to slaughter or transferred to some other ranges. A small per cent of these have been transferred to the western part of our state on the ranges that have hitherto been largely occupied by cattle. Estimates of the number of stock sheep is derived from estimates of the amount of wool shorn, the number of lambs sent to market and the trend as shown by the assessors' figures, commission men and regular reporters. The assessors in most counties show the different classes of sheep such as those that are termed range sheep and those that were in the feed lots.

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This year we have approximately 1,250,000 sheep and lambs mostly lambs on feed in our state. They are fed in three well defined districts. In two of these districts there is an abundance of alfalfa that has to be marketed in this way. This feed is supplemented largely with corn shipped in from Nebraska and Kansas. A third district is what we call our San Luis Valley district where the principal feeds are peas, both the grain and the straw, supplemented with the barley.

The principal sources of information which I have found readily available are through the most extensive and reliable commission men, one firm handed over 1200,000, and the live stock agents of the various Railroad Companies. The Railroad Companies make a careful canvass of the number of cars shipped into their various territories thus giving a reasonably close estimate of the number of sheep on feed. They also give us close estimates upon the number of cattle and hogs moved. We also make an effort to check our sheep figures with the wool crop, as shown by the wool buyers and the railroad shipments.

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No. 73 a
January 25, 1917.

SUPPLY OF MEAT ANIMALS.

By
George K. Holmes.

This country of ours produces one-third of the meat produced in this wide world, leaving out the Chinese, Japanese, and Hindus, and they are small meat consumers. We are the most voracious meat eaters among human beings, except possibly the Argentines, the Australians, and New Zealanders. One-third of the nutrients that we take into our bodies are meat and the products of meat; an amount that is equal to the entire cereal nutrients, and is also equal to the total of the dairy and poultry products, of the sugar, of the fruits and vegetables, and of the minor foods. And yet, we have always had a surplus, a national surplus, of meat and its products.

Meat exports have been wonderfully large for many years, for the reason that our production of meat has been unparalleled by other nations, and we have had a surplus for sale, notwithstanding our enormous national consumption. About 100,000,000 pounds of meat and meat food products were exported in 1850, and from that year the quantity increased to $1\frac{1}{2}$ billion pounds in 1879, to $1\frac{3}{4}$ billion pounds in 1890, and to about $2\frac{1}{3}$ billion pounds in 1898, and this was high-water mark. From that year there was a rapid decline to a little over 1 billion pounds in 1913, and then followed the European war, some increase in our beef production, and considerable increase in our pork production, so that in 1914 the exports jumped to more than $1\frac{1}{2}$ billion pounds, and in 1915 to almost 2 billion pounds, an amount that has been exceeded in only five years.

The importance of edible fats and oils of beef and pork in our exports has long been relatively enormous. This class of exported meat food products constitutes nearly one-half and sometimes more than one-half of our exports of meat and its food products.

The declining fraction of beef and its food products in the total meat exports from the United States is prominent down to 1913. From 31 per cent of the total meat exports in the ten years 1894-1903, the beef fraction declined to only 14 per cent in 1913; but Europe's war demand at any price raised the beef fraction to 26 per cent in 1914, followed by 23 per cent in 1915.

Of the total meat export trade of the United States, pork declined from 69 per cent in the ten years 1894-1903, to 67 per cent in the following five years, but subsequently increased year by year to as much as 83 per cent in 1913, followed by a drop under war conditions to 72 per cent in 1914, but with some recovery to 75 per cent in 1915. Mutton has always had an insignificant place in our meat exports. Bear in mind the strength of pork and its products in our exported surplus.

Previous to 1913 the highest amount of meat and meat products imported by this country in one year was hardly more than 20,000,000 pounds, or

hardly enough for a national luncheon. Our meat consumption in one day is 50,000,000 pounds. The law of 1913 admitted meat to this country without payment of duty, and the imports in that year jumped to over 200,000,000 pounds; in 1914, they reached 239,000,000 pounds, but in 1915 the quantity fell to less than 100,000,000 pounds, because in the meantime our meat production had increased and also because Europe paid high prices for South American and Australian meat, and also largely controlled its movement.

So you observe that notwithstanding free trade in meat, our imports have failed to reach a figure higher than 239,000,000 pounds, or a national ration for less than five days. At the same time don't forget that we were exporting $1\frac{1}{2}$ billion pounds in 1914 and 2 billion pounds in the following year, or an amount in the latter year sufficient to feed the United States for forty days. Our meat exports were to our meat imports as the national ration for forty days is to that for five days, or as 8 to 1.

However, this country did reach a point in 1913 when the production of fresh, chilled, and frozen beef was 174,000,000 pounds below our consumption, and the deficiency was 14,000,000 pounds in 1914; and on account of the deficiency in fresh, chilled, and frozen beef in 1913 there was a national deficiency in the total of all beef and its products in that year by 34,000,000 pounds. That is to say, we consumed more beef than we produced in 1913 by that amount. Beef has rebounded, however, in production, and beef imports have much declined since 1913, so that we are now again on a substantial export basis.

In 1913 also there was a deficiency in the production of mutton to the extent, however, of only 8,000,000 pounds, and in the next year the deficiency reached 12,000,000 pounds, followed by a deficiency of 5,000,000 pounds in 1915. In 1916, however, this country again became a mutton surplus country, notwithstanding our decreased production, on account of the insistent demands of warring Europe.

In the course of the work of the field agent concerning beef animals, he takes account of the number of head and not of pounds of meat, and it may be worth while to examine the subject from this point of view. As far back as 1840 nearly 15,000,000 head of cattle were found on the farms of the United States. The number increased to nearly 26,000,000 head in 1860, to 36,000,000 in 1880, to more than 51,000,000 in 1890, and to nearly 68,000,000 head in 1900. The next census, that of 1910, was taken April 15 instead of June 1, and this change of data has upset the comparison of that census and of subsequent estimates by this Bureau with preceding censuses.

The farm census cattle of 1910, nearly 62,000,000 head, declined to 56,500,000 head in 1913, and the number remained about the same in 1914, but there was a perceptible increase in 1915, and again in 1916, to be continued in 1917, when the number of cattle on farms is estimated to be 63,600,000 head, or nearly 2,000,000 more than in 1910. This country has in recent years been passing through a radical readjustment of beef-cattle raising, during which it was practically necessary to slaughter a considerable fraction of our producing stock of cattle. We seem now to be recovering

from the loss caused by the extinction and restriction of ranges, the transfer of feeder production from the range to the farm, and by the very considerable increased cost of producing beef due to higher costs of feeds.

On the basis of the old census date of June 1, we now have about 67,500,000 cattle in this country, or almost precisely the highest number ever found in the census enumeration, and that was in 1900. Besides these cattle on farms, there are about 2,000,000 head of cattle not on farms, so that our total number may now be regarded as almost 70,000,000 head for the date of June 1.

An important general fact appears upon an examination of the record of the number of cattle in the various countries of the world for recent years, say since about 1907, and this general fact is that in most of the countries the number of cattle in these recent years is about stationary; in a much smaller list of countries, now including the United States, the number of cattle is increasing; and in Canada the number of cattle is decreasing.

The sheep on the farms of the United States grew in number from 19,000,000 in 1840 to 22,500,000 in 1860, to 35,000,000 in 1880, and to 36,000,000 in 1890, not including spring lambs for any of those years; but spring lambs were included in the census of 1900, and 61,500,000 sheep including lambs were found on farms and ranges in that year. The shift of the census date in 1910 much reduced the number of sheep below what they would have been June 1, and only 52,500,000 sheep were found. Since that year, the estimates of this Bureau show an almost unbroken decline to 48,500,000 sheep in 1917. This is for the date of April 15, but if the number is properly increased as for June 1 it would be about 58,000,000 sheep now on farms, to which about half a million sheep may be added for those not on farms.

In recent years, or since about 1907, sheep have absolutely increased in Argentina, Uruguay, New Zealand, British South Africa, and a very few countries of much less importance; but the countries in which sheep are absolutely declining in numbers make a long list and include such countries of high importance as Australia, European Russia, the United States, the United Kingdom, France, Austria, Germany, Canada, and other countries of less importance.

Hogs do not fit into the agricultural economy of the various nations in the same ways and degrees that cattle and sheep do. This is partly on account of the corn crop, three-quarters of the world's production of which is derived from the United States, partly on account of other swine feeds, partly on account of range conditions and of climate, animal diseases, and other factors.

The census found 26,000,000 swine in this country in 1840, 33,500,000 swine in 1860, nearly 48,000,000 in 1880, over 57,000,000 in 1890, and nearly 63,000,000 in 1900. The change of census date in 1910 reduced the census number to a little over 58,000,000, and since that year the estimates of this Bureau have been highly variable. A large increase to 65,600,000 was estimated for 1911, but the swine number declined to nearly 59,000,000 in 1914, followed by increase to 67,800,000 in 1916, with nearly the same

number, or 67,500,000 in 1917.

If an estimate of the number of swine on farms be made for June 1, it will be found that almost 80,000,000 swine is our national farm total, to which should be added over 1,000,000 swine not on farms.

The general fact appears to be that throughout the world cattle are hardly increasing absolutely, sheep are declining in number, and swine are increasing, and these tendencies are found in the United States, except that the number of cattle seems to have increased since 1914. It would seem as though sheep, notwithstanding both meat and wool, are not desirable economic animals, that swine are of the contrary character, and that cattle are in the balance.

I have been speaking of the numbers of these animals, the absolute numbers, but, still having the world in view, if we think of these numbers as related to population our conclusions must be accentuated. Sheep are far from maintaining their numbers in comparison with population, and in some small degree cattle are failing to do so, but in the case of swine there has been some gain above population in recent years, although it may be a small one.

There has long been an economic conflict between the range, with its cheap land and extensive conditions, and the farm, with its relatively high-priced land and intensive conditions. The United States passed rapidly into range production after it was once begun, and to a large extent rapidly out of it, although there is still a vast area used for sheep and cattle grazing.

The economic strength of swine has been demonstrated by 40 centuries of agriculture in China, during which time the reduction of farms to an area of a very few acres has permitted the hog, alone of meat animals to survive on such minute farms. This animal is gradually increasing throughout the world, and its importance must grow if sheep continue to decline in numbers and cattle fail to produce the world's beef at moderate prices. The inference is not suggested, however, that other countries are to arrive at the conditions in China.

The strong economic character of the hog is something that has forced itself upon my attention time and again in various studies that I have made. Pork and its products are most persistent in foreign trade, especially fats and oils.

The hog too, is an animal that can be produced under the most severe strain of economic conditions. You will remember that Professor King, in his book on the agriculture of China, mentions a family of twelve members living and getting a living on $2\frac{1}{2}$ acres of land, and maintaining a donkey, poultry, and several hogs. It is usually impossible that one sheep or one bovine animal could be maintained on one of these small holdings, that is, economically maintained, and yet you will find hogs everywhere in China on these minute farms. Whether or not there is to be a pressure of population upon the means of sustenance throughout the world that will display a tendency toward, only merely toward, the conditions that have developed in shut-

in China, is it not indicated that under existing conditions in this country the hog is by far the most economic of our food animals?

After the hog has been produced and slaughtered its superiority follows the carcass. The percentage that the dressed weight and the weight of the edible offal are of live weight of sheep and lambs is about 54 to 56 per cent, for calves about 59 per cent, for cattle about 75 per cent, and for swine 84 per cent of the live weight. Conversely speaking, out of the live weight of sheep and lambs 44 to 46 per cent does not enter into the weight of the dressed carcass and of the edible offal; of the live weight of calves 41 per cent is excluded from this food weight; of the live weight of cattle 25 per cent is excluded; and of the live weight of swine only 16 per cent. What an immense superiority from the point of view of food utilization the hog presents.

It is easy to speak glibly concerning the number of meat animals after the number has been ascertained, but I am not unmindful of the many difficulties that the field agents have in arriving at their estimates. It is a most difficult proposition. One idea stands out of my reflections for brief mention. You estimate the number of animals on hand on January 1, but naturally this must be a date that is somewhat approximate. However, that may be, the number of animals on hand at or about this date may be in a degree and with fairness a number that is too low. It may happen and does happen in this way: The corn crop may have been below par in quantity; therefore the price goes up as the autumn advances, the corn cost of fattening hogs, for instance, increases, but hog prices do not keep pace with this increase; consequently the production of pork may be carried on at a loss and of course the farmer is quick to perceive this. What is he to do in this situation? Shall he continue to feed high-priced corn to produce relatively low-priced pork? Instead of doing that, he hastens his hogs to market, he advances their selling to a date earlier than the normal one, and, after he has permanently sold hogs, there seems to be a dearth of hogs. Superficially the number of hogs has declined, whereas in a fair consideration of the whole feeding and marketing season the number of hogs, say for January 1, should be regarded as about as usual instead of below the usual, as in point of fact it may be.

At the close of what I have to say concerning meat a few words may concisely express the results of a broad survey of the subject. Although meat is an important food of this country, after all our per capita consumption of meat is declining. There were declining exports too in recent years, until the European war set up an imperative demand for meat that must be had at any price.

This country can probably always find a profitable and ready market for whatever national surplus of meat there may be. The quantity of this surplus must be determined according to conditions of the demand and supply in the world's markets, where ability to pay the price will determine who shall eat the meat. A world-wide survey of the subject warrants the conclusion that the per capita consumption of meat in this country and in other prominent meat-eating countries will decline in the

future, even though the total per capita consumption of all food nutrients may be increasing. There is an increasing consumption of other foods per capita that will probably make it essential that the meat consumption per capita shall diminish. The per capita consumption of foods of the vegetable kingdom continues to increase; among these sugar is prominent, and so is wheat; and besides these there are the numerous vegetables and fruits that are preserved for unseasonal consumption by canning, drying, and cold-storage. Such are the scores and hundres of good things that the farmers and food manufacturers are offering to us to eat that we need have no dietary worries because our engorgement of meat is declining.

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January 25, 1917.

LIVE STOCK MORTALITY.

By
P. N. Gray.

It was estimated by the Bureau in 1915, based upon the average rate of loss during 30 years preceding, applied to numbers and values of live stock in that year, that the losses from diseases in the United States amounted to about \$150,000,000, and that the losses from exposure amounted to about \$44,000,000, making an aggregate value of \$194,000,000 a year. From these figures it will be seen that the mortality of live stock is a subject of great importance, and the values are appreciable in a high degree.

The losses from diseases as they affect different animals, well known to the Field Agent, consists chiefly of the following: Texas fever and cattle tick, tuberculosis, anthrax, internal parasites, hog cholera, scabies and a miscellaneous list of diseases unnecessary to specify.

From exposure, the losses are listed being from neglect under adverse weather conditions and insufficient or irregular feeding.

Whatever the causes, these are subjects which engage our attention during travel throughout the year.

Inquiry by schedule into this loss has been the work of the Field Agent annually during March, for report as of April 1st.

The question for consideration, is the date at which inquiry should be made, that the accuracy of statistics be better subserved. Is there, taking all live stock into question, a better date in the year for the assembling of this data? Would January 1, the date for enumeration of live stock by the Bureau, be the proper month, that the report on numbers and losses be made simultaneously?

In Texas, I have had the question asked me with reference to that date of report on other cattle by cattle raisers, and when I have attempted to answer, have always been confronted with the difficulty of reconciling a date better adapted than at present for ascertaining the mortality of other live stock. A cattleman might be as well enabled on January 1 to report upon losses for twelve months preceding as far as other cattle were concerned, but would that date serve the purpose of inquiry as well for sheep, swine, horses, mules, etc.?

This is a subject that has been assigned to me in connection with several bi-issues treated by other agents under the general subject of "Live Stock," and I must confess, after careful inquiry, my inability to throw much light thereon, except to say that I do not believe that for all live stock, a better date could be determined upon than the date now in use.

UTILIZATION OF ASSESSORS' REPORTS.

By
W. W. Putnam.

In common with many other methods of gaining information that of utilizing assessors' reports is used and subject to limitations and errors depending upon the laws in each state governing the organization and securing of enumerations. In different states there are usually different bases of valuation. In Colorado within the last ten years there has been some changes both in the basis of valuation and the efficiency of the work. For five years we have had the services and check of the state tax commission. This commission has made an effort to equalize valuations and to compel assessors to obtain actual numbers and cash values. The commission has not altogether been successful in attaining its purposes. By conference with different assessors I find they still feel there is considerable evasion of the facts. In the case of live stock adult horses are considered to be about 5 per cent below the actual, mules less than 5 per cent, other cattle which constitute the range cattle about 15 per cent while dairy cows are very far from correct. This is due to the fact that a great many of the cows used are of the beef type, and owners seek to secure a lower valuation by placing them in this class. In the case of sheep there is also considerable evasion amounting to approximately 15 to 20 per cent. With us hogs is a class of live stock that is much below the actual number estimated at 20 per cent, due to the fact that no young pigs are assessed on April 1st.

I find in the case of live stock that the numbers of the different live stock as compared to January 1st, varies greatly from those of the Bureau. Owing partly to the fact that the assessors' figures pertain to the preceding April 1st, and partly to the difficulty in obtaining correct enumerations. Enumerations are effected by some evasion on the parts of the owner and by the effort of assessors to equalize assessments. Assessors frequently diminish the actual numbers of live stock in a given assessment in order to equalize quality and have the stock assessed according to a standard valuation. Similar discrepancies occur in the classifications of the different kinds of land. Thus good unbroken land may be classified as agricultural land though not in actual cultivation or as poor land. On account of these cross classifications the assessors' figures on land give us very little assistance in determining the number of acres under cultivation.

The assessors' figures are very much out of date in Colorado and furnish very little assistance except as showing the trend of our inquiries.

Colorado has a law providing for taking agricultural statistics by the county assessors. Though this law has been upon the statute books for over three years, no assessor has complied with its provision sufficiently to obtain anything of value more than to furnish few comparative figures in a few of the counties of the state. However, we hope to have these sources of information very much improved within the next two years.

County Surveys.
by
V. A. Sanders.

The first summer of my work was spent mainly in trying to find out what there was for me to report upon and where it was. After six months of Unsuccessful and unsystematic search I worked out the plan for a comprehensive survey that should furnish an adequate working basis upon which an effective organization for estimating crops might be built.

The county seemed the smallest practicable unit, and was adopted. A complete list of all the crops and farm animals that we cover during the year was prepared, together with sub-headings to each one, touching such points as relative importance, general status and tendency, average yields, quality, etc., and sources of reliable data therefor.

First efforts to find persons with a county-wide acquaintance and knowledge of these subjects showed that but few people knew conditions in more than one or two towns beyond their own. Big farmers, who had been or were county officers and had traveled pretty generally over the county, were sought out. Other times different classes of persons were found to have the desired information; in some cases county agents; in some cases the Bureau's county reporters. About six months were given to gathering the data for the counties -- 51 in all -- this subject being made special work in connection with regular travel.

Such information thus gathered need not be closely exact; but it served a most useful purpose. Some of the county agents and extension services requested the privilege to make copies of the surveys.

The completed surveys made it possible to plan itineraries more effectively, to gather more adequate data, to visit the important crop centers at proper times, and to build up a strong corps of well-informed reporters, properly distributed over the counties; showed what crops needed special lists; that the well-informed farmer is the best source of reports on the crops which he grows. They indicated the advantages and desirability of more exact and intensive surveys for particular crops and animals.

Such intensive surveys have been made for Maine potatoes, Massachusetts cranberries and tobacco. Inquiry has been under way for two years on apples in each State, but the crop is grown over so great areas and presents so many difficult problems that much remains to be done.

Such survey shows what localities in each county produce the crop, the relative importance of localities, tendencies, sources of reliable information, and study has been made to determine the best methods, forms and dates of inquiry. The general situation and possible sources of more reliable data about farm animals, including a study of all data of record back to 1896, has been gone over. The close agreement of assessors figures with the Census where the two include practically the same animals, or constant proportions of any given class, is shown for 1900 and 1910; also the departure of the Bureau's estimates from both are quite apparent several years. Various sources have been consulted as to the degree of exactness and completeness of assessors figures.

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January 26, 1917.

COOPERATION.

By
G. C. Bryant.

In the matter of cooperation, either with the state, agricultural school, county agents, associations, firms or individuals, I would say it is a good thing, for the principal reason that it creates another source of information, and sends the Bureau's reports where it is most desired they should go. Before starting a line of cooperation with anyone, however, be sure you have a favorable acquaintance with them. I consider this as great an advantage as the information you may get or be able to give. Another particular essential is for the other fellow to have confidence in you and your reports, and you must also know that he is giving you reliable information. Much time may be saved for travel in sections where there is no cooperation because the other fellow puts you in touch with large areas as a general rule. Sometimes it is necessary to give a little more than you receive, but the information is for the public, and we should not care about that. In Indiana nearly every one now looks upon the Bureau's report as being the only reliable one, and much better than anyone else can possibly produce; consequently they have ceased to try and are looking for cooperation with some one who can show them where they will be benefited.

The latest phase of cooperation in my state has taken rather a peculiar turn: It is with the Chambers of Commerce in the different cities, and I find it one of the best and most reliable sources for disseminating the monthly reports that I have yet discovered, especially in those cities where the secretary is a paid official. These commerce bodies want publicity--perhaps I should say notoriety--for their cities and counties and will gladly assist you in any way if you will give them information on which the newspapers can put a "scare head" and thus get them in the lime-light. Another good feature about it is they will always give the Bureau and you credit for the information. I am sure this method has given the Bureau and myself more publicity within the past five months than all that was received through the Weather Bureau in two years previous. Of course this was brought about to a certain extent by the publication of my report on production of the principal crops by counties. Now they want the acreage figures for the production in their counties and the counties adjoining. All this makes a lot of extra work and worry for me, but if we can get the farmers interested in their own counties, it will not be long until they are interested in the state and nation, and then we will be able to select our reporters from intelligent and capable men, and without difficulty. The farmer is more or less a curious individual, and if he reads the crop reports for his own county he will begin to wonder where and how such information is secured, and naturally, begin to inquire who is responsible, especially if he feels that he can criticise the report. When he commences that it will not be long until he is our everlasting friend, and at the present time that is about the only place where the Bureau's reports do not have a good standing. Generally speaking the farmer thinks the Bureau's reports are solely for the

benefit of the speculator. It is our duty to convince him that he is the one we are trying to benefit by giving him the reports as soon as any one else gets them.

State departments of agriculture and statistics are usually of some assistance to the field agent, either in a general or specific way, where statistical information is gathered and disseminated by them. They have sources of information that are more or less unreliable--such as township assessors' reports, etc., which are usually compelled by law and without extra compensation for such statistical report, except that it might have a tendency to prolong the assessing work. However, these reports will, as a general rule, show the trend of past years at any rate, and the field agent can get an idea of what his reporters are doing and whether he is being misled by persons with whom he comes in contact in his official travels.

Agricultural colleges, especially the extension department, are a material help. Their instructors are out over the state a great deal of the time and make reports to the colleges showing conditions as they find them, and these reports are unbiased. They also are well informed on where the farming generally is on a progressive plane or otherwise. The bulletins gotten out by them are a help, principally because they pertain only to the state. The head of the horticultural division has a good knowledge of the fruit crops and can give information regarding conditions in the principal fruit growing sections. The head of the soils and crops division keeps in close touch with all sections of the state and is well posted on conditions and acreage, especially on the special crops. The extension director is a well posted man and has many sources of information which are very valuable to the field agent. Make him your friend if possible, and through him you can reach the county agents. The county agents are hard to get in touch with because they are in the country nearly all the time. They know the conditions in their respective counties. If you can make a friend of one of them you will at least have one reliable reporter in the county. They are busy fellows, and you should have something for them when you make the first call. About the best thing is a little memorandum sheet showing the farm acreage in their county and the proportion devoted to the different crops. I have never yet found one who did not appreciate such information and was very glad to get it. These men are more scientific than statistical, but they soon learn the importance of the work and are very careful and painstaking with their reports. Besides coming in contact with the county agent through the extension department of an agricultural school you can go much further. The law requires, in Indiana at least, that the county superintendent of schools cooperate with the county agent. The limit of your work through this source of information is only limited by your imagination. You can go as far as you like here.

State grain dealers and millers associations, state corn growers associations, state horticultural societies, live stock feeders associations, etc., all have ways of gathering information and can help through their officers, with whom you should become acquainted as soon and as favorably as possible. The large personal acquaintance of these men is worth a great deal to you if you can make them your friend. These offi-

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cials are constantly in touch with the membership of their respective associations and consequently well posted.

Many of the officials of these associations and societies as well as firms and individuals maintain a staff of correspondents who report regularly on crop prospects, either for their county or section, and when compiled generally cover the greater portion of the state, and it is well to know them--by their first name--if possible. They can give you information that may save you much time, and we have none too much in which to cover our territory.

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CRITICISMS.

By
J. A. Ramey.

Criticisms generally are directed at those things which antagonize selfish interests or purposes. Scant thought seldom is given to things which do not in some way concern one individually.

The farmer of the west, the great roller mills, and the gambler of the wheat pit, give but little thought to reports on cotton; and, vice versa, the cotton planter, the cotton mills, and the habitués of the cotton exchanges, are not apt to quarrel about the most sensational condition or acreage estimates on wheat. It is the man interested in cotton prices who watches most closely the Bureau's reports on cotton. Likewise, with corn, wheat and oats.

There are three classes of persons who are interested in the prices of farm products, namely: the producer, the mill or consumer, and the speculator. The former two classes, the producer and the consumer, have a legitimate interest in all estimates prepared by the Bureau, and are hostile to any inaccuracies that may occur therein. Not all of them seem yet to realize that it is for their information and protection that these reports are made; that the sole purpose of the reports is to regulate the prices of farm products, according to the law of supply and demand.

The Bureau owes the producer and the consumer equal service, and endeavors impartially to discharge that obligation, yet criticisms of the Bureau's reports are more frequent among producers than consumers. This is due to two causes. First, because of the immediate effect on prices of raw products, the influence of the Bureau's estimates is at once noticeable, and is felt by the producer first. If the prices go up, no thought is taken by him of the cause, or credit given; if prices go down, the fault lies at the door of the Bureau.

In the second place, most of the criticisms heard arise from the ignorant or prejudiced classes. There are still many persons in the remote parts of the country, and a few in the less remote or even enlightened sections, who are so blinded by ignorance, or prejudice, as to believe that all governmental functions are performed in the interest of the rich, and against the interest of the poor. Hence, they believe, or assume to believe, and so assert, that all reports issued by the Bureau of Crop Estimates are colored to suit the speculative interests.

Other criticisms arise from persons influenced by their own environments. If the Bureau's reports vary very radically from the conditions of any particular locality, the inhabitants thereof are apt to criticize them. The best method to combat such criticisms is through written reports from the Field Agent, to be published by the local Weather Bureau simultaneously with the issuing of the statistical report. Such reports should be general in character, but so expressed as to give an idea of the condition of all leading crops in all sections of the State. Such reports would tend to ad-

vertise and popularize the work of the Field Agent. Relatively, the Field Agent is known to but few people of his State. Restrictions, heretofore thrown about him, tended to withhold rather than introduce him to the public, and he became known only to those with whom he came in personal contact. Hence, the masses do not know the character, the name even, of the man who reports on their crops.

The third class of persons having an interest in the Bureau's reports are the speculators. This class has no legitimate interest in our reports, but it is from them that the most damaging criticisms arise. It was for the purpose of protecting the producer and consumer from false estimates by unscrupulous speculators that the Bureau of Crop Estimates was first organized. Notwithstanding its steadfast adherence to that purpose, the speculative interests are eager to magnify the slightest error of the Bureau. If the estimates of the Bureau can be discredited in the minds of the general public, the "made to order" estimates of the speculators will have greater influence. It is difficult to combat such criticisms. Parties disseminating them know of their falsity, and care nothing for the facts. So far as such critics as a class are concerned, their criticisms are unworthy of notice; but such criticisms are widely advertised, being made to influence either the producer in his selling or the consumer in his buying, and, to the extent that they are accepted as true, they work an injury to the general public. Then, in the interest of the general public, the general public should be protected by the Bureau from its own credulity. Immediate refutation of all criticisms should not be undertaken, because at best our reports are based upon estimates, and the facts in question are not immediately provable. Confident of the accuracy of our estimates, we should be content to await the verdict of final results. By this verdict justly we should stand or fall.

All criticisms ultimately may be met and combatted by a strict adherence to the following formula, namely: accuracy, circumspection, education.

First - we should endeavor to make all reports accurate from time of planting to final estimates of production, in order that we may be sustained by final results. This calls for active and high grade service by all connected with the reports, the Field Agents and Crop Specialists especially.

Second - every employe of the Bureau should walk circumspectly at all times, avoiding the appearance of evil, or associations calculated to put the Bureau in disrepute. Associations with the speculative interests especially should be avoided. If an agent calls frequently at some broker's office, the Bureau might become associated, however unjustly, with any shady or sensational transactions or reports that might emanate from such office.

Third - we should take the public into our confidence, and by a campaign of education, acquaint it with our methods of preparing and issuing reports, the safe-guards thrown about the Crop Reporting Board, the penalties which attach to a betrayal of information, the impossibility of "leaks", and the general accuracy of estimates of previous years. One great misapprehension under which the general public labors is the belief that each Field Agent and Crop Specialist, as well as officials in the Bureau, knows in advance just what the report will be. Thinking this, it is justified in believing

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that no secret can exist as such when known to so many parties.

The Bureau could well afford to advertise the fact in the most effective way known to it that no Special Agent, nor any Field Agent, knows in advance within several points of what the report will be on any crop for his specific territory, and certainly not for territory outside of his district, as all communication between agents as to crops is prohibited. Also, that the Crop Reporting Board, prior to being locked in the reporting room, has had no access to the reports of Crop Specialist and Field Agents, which determine largely the figures adopted, and, therefore, has no knowledge of what the report will be. The Field Agent should guard the Bureau against false reports. His tact and resourcefulness should enable him to combat all criticisms met by him. A knowledge of human nature may be essential, but usually an explanation of the purposes and the modus operandi of the Bureau will satisfy the honest critic. The dishonest critic, he of a "hardness of heart and a reprobacy of mind", should be left, like the herd from which he descended, to wallow in his own mire. It is folly to cast pearls before swine.



No. 79 (a)
January 26, 1917.

VALUE OF UNBIASED, ACCURATE AND AUTHORITATIVE
CROP REPORTS

By
V. H. Olmsted.

This Bureau, as is well known to "the ancients", was originally designated "The Bureau of Statistics", and was the first, consequently the oldest, Bureau of Statistics in the United States, and, as far as I am now informed, in the World, having been in existence since 1862, long before the Department of Agriculture was established. Under its old and new names it is now about 55 years of age.

The original designation was, however, a misnomer. The word "statistics" means, either in the singular or the plural, an aggregation of related facts, either past or present, based on records or enumerations, presented in numerical, tabular form; or, as one dictionary defines it (or them), "collective facts stated numerically and systematically".

The Bureau of Statistics dealt, and now deals, not with ascertained established facts, either past or present, but with estimates, relating wholly to Agriculture, consisting of either estimates of areas, conditions, yields, numbers or prices. Largely, but not wholly, they were and are forecasts, the estimates or predictions being made scientifically, based on reports, also estimates, made by large numbers of persons interested in or having more or less knowledge of Agriculture and its direct or derived products; so that, in no sense, actually, was the Bureau a "Bureau of Statistics". This fact, added to the fact that the creation in the Treasury Department of another "Bureau of Statistics", true to name, (which has since been transferred to the Department of Commerce) led to more or less confusion, and resulted, early in the present Administration, to a change, by Act of Congress, by which the existing designation was established.

Some nine years ago, during a period of about a year, I was temporarily detached from this Bureau to superintend the taking and compilation of the second Cuban Census (I had taken the first Cuban Census about 8 years previously). While engaged in this outside work, I took advantage of some leisure time to prepare, in brief form, a monograph on the value of Government Crop Reports to the producer, consumer, dealer, manufacturer, transportation agencies, and the public generally.

I was moved to do this because, for a considerable time previously the Bureau had apparently lost caste with an appreciable proportion of the people who were more or less interested in or affected by our work. The figures we promulgated were regularly and baselessly attacked by persons who claimed to know more about the subjects we dealt with than we ourselves knew, and these attacks were published in newspapers and trade journals with allegations, frequently, that what we gave to the public was in direct opposition to the interests of agricultural producers and played into the hands of speculators in food products.

Farmers and others often gave heed to these outrageous statements and believed them, and our work, or rather its reputation, suffered accord-

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ingly. We had been already seriously injured in reputation by a "leak" which has become historic, and this, combined with the seemingly growing impressions caused by the false ideas above referred to, put the Bureau under a somewhat heavy cloud, to emerge from the shadow of which we were struggling with all our strength.

The monograph prepared under these circumstances was turned over to the Acting Chief of Bureau, Dr. C.C. Clark (now of the Weather Bureau), and was published as Circular 17, and was given as wide a circulation as circumstances then permitted

The present Administration of the Bureau, under its changed name, enlarged, revised, and greatly improved the original Circular 17, and caused a large edition to be printed, - 50,000 copies I believe, and every Field Agent has been supplied, I think, with copies of this revised edition. I, personally, have used this circular with much benefit and advantage, (have exhausted the entire allotment supplied me) as it furnishes complete answers to questions and criticisms likely to be encountered every once in a while.

No. 81-a
January 26, 1917.

PUBLIC ADDRESSES:
OPPORTUNITIES AND BENEFITS.

By
Lucas Moore.

What I shall have to say on the subject of public addresses, in relation to our work as field agents, must be from the speculative rather than the experiential standpoint, a prophecy of what may be accomplished and not a recital of deeds done. I am thoroughly convinced however, that lucky indeed is the field agent who has, added to his many other varied accomplishments, the happy faculty of calmly facing an audience and delivering his message in a forceful manner.

That there is need for this sort of work, there can be no doubt, for in no other way may the Bureau be brought so thoroughly to the attention of the general public and the suspicion and distrust which sometimes hamper its usefulness be allayed. So important is this method of bringing the Bureau into closer relationship with those for whose benefit it is intended, that opportunities should be tactfully sought, rather than awaited. As an instance of a field where tactful seeking may be profitably employed, I would point out the many farmers clubs which are to be found wherever that other most helpful branch of the Department, The States Relations Service, is at work. Keeping in touch with the County Agents, opportunities for being present at club meetings may generally be had, and rarely is the program so crowded that time for a few remarks from the field agent cannot be found.

It is in these farmers clubs, too, that the suspicion and distrust spoken of flourish. The fact is regrettable but none the less true, and it is remarkable that so many farmers, who welcome enthusiastically the assistance of the Department, exerted through other agencies, will, at the same time look upon the publication of agricultural statistics as being in some way a collusion with the speculative world in order to rob the farmer of the greater part of his profits; without stopping for a moment to consider how incredible it is that the Department of Agriculture would spend hundreds of thousands of dollars one way, in adding to the prosperity of the farmers, and then turn around and spend a like sum in taking it away from him by another.

When I am in a gathering of farmers and have introduced myself as laboring in the interest of the Government Crop Report, so conscious have I been of this latent suspicion that I have felt relieved when some member of the group would break out with the statement, "I don't believe in the Government Report". I confess to a strong inclination to run away from anything like a public address, whenever possible, but I am glad I can truthfully say I have always welcomed such opportunities of meeting criticism of the Bureau and in the discussions which have followed I have always found criticism based upon lack of knowledge of the far flung and thorough methods of gathering information upon which the reports of the Bureau are based, as well as upon failure to appreciate the benefits of the reports to the business world, especially the farmers.

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With the need of public addresses admitted, there yet remains the handicap of lack of time in which to employ it to an extent which might prove helpful, for after devoting the necessary time to office work the remainder is scarcely sufficient for getting over our respective territories and obtaining first hand information of subjects upon which we are called upon to submit an exhaustive report, without turning aside for anything short of the main object. Therefore, until such time as Congress sees proper to provide us with an office assistant, this work, important though it be, must largely remain undone.

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No. 82 (a)
January 26, 1917.

SPECIAL INQUIRIES AT INITIATIVE OF FIELD AGENT.

By
E. T. Marchetti

Until included on our regular schedule, I found a special spring inquiry on the seeded acreage of the fall prior, an excellent verification and often correction to the preliminary fall estimates made the preceding December. This special inquiry gave the regular aids several months additional time for any corrections they desired to make, and especially when the weather was extremely dry in the fall, which influenced the tendency to under-estimate the seeding. A spring acreage inquiry on the fall sown acreage usually afforded the pessimistic reporter an opportunity to establish his equilibrium.

A special inquiry to threshing machines and combine harvesters, in the northwest, on the total acreage, production and average yield harvested by each individual machine, in all portions of the state, I found to be an excellent inquiry as a verification of acreage estimates of the regular correspondents. However, the establishing of a special threshing machine list of aids is a laborious and discouraging task, as several years are required to establish a successful and permanent list, due to the fact that the percentage of replies received to the number of special inquiries mailed is often small.

The special inquiry of the divisions of the typical farm into the acreages of the various crops, is of great value for acreage information, if a sufficient number of reports can be received to eliminate the unusual ones, which often influence untrue totals when the reports are scattering and few.

Special inquiries also aid in reviving the interest of that percentage of reporters who reside in portions of the state that produce only one or two of the crops included on the regular schedules, resulting in a lack of interest and a low percentage of returns. The interest of these classes of aids can often be stimulated by special inquiries typical to the individual areas. Care, however, must be taken in not over-burdening the regular aids with special inquiries, which may often contribute in their losing interest in reporting by a too great demand upon their resources. Therefore, often special and segregated lists are required.

When I first took charge of my territory and was still unacquainted with all portions of my states, I noticed that occasionally reports were returned that varied greatly with the remainder of the reports from the same districts, especially in the condition of hay and grain. The reports on many inquiries were in accordance to the remainder of the schedules, demonstrating the intelligence of the varying reporter.

To understand better these unusual and high reports, I mailed a small map of the different states to the various reporters, asking them to illustrate the heavier and lighter land sections of their scope of report, also the irrigated areas and indicating by a dot their residence location. When the maps were returned and reviewed, I was logically able

to understand the occasional and unusual high report as in practically every instance the reporter resides in a small private irrigated section or in small areas where the rainfall, on account of surrounding mountains or hills, was considerably heavier than in other surrounding areas.

The success of the Bureau depends considerable, not alone in producing accurate results for growers of crops, grown nation wide, but also in producing accurate results and some information for the growers of special and limited crops. These class of growers, whose interests are confined in limited areas, and for whom the regular schedule holds little of interest, demand and deserve recognition as they are often hampered in securing accurate information of the limited crops grown in other states.

Although these special inquiries are of great value and assistance to the agent and growers of the regular schedule inquiries and on crops grown in special areas, yet it is of greater importance that the replies to the special inquiries are sufficient to secure accurate results. The publication of a special report that is inaccurate and the result of estimates of only a few special aids in which the unusual or erroneous report may influence the reports as a total, is dangerous as it evokes the criticism of those who may be well informed and may establish an unsatisfactory record for the Bureau, which years of accurate reporting of the regular inquiries will not obliterate.

To satisfy the grower of crops in limited areas and even to add prestige among the producers of the regular inquiry, I think it advisable for the Field Agent to prepare an occasional multigraphed report, when the inquiry has been especially successful and with the consent of the Bureau, mail it to his regular or special list of aids. This will bring the Field Agent and Aids in closer understanding and will demonstrate to the Aids their value, especially on crops that are grown in limited areas.

I do not think it advisable to have the special inquiry detract from the necessary time devoted to the regular inquiries. If limited time requires sacrifices, I think the special reports should be sacrificed at the expense and accuracy of the regular inquiries. Neither is it practical or possible to outline a regular list of special inquiries.

No. 83 (a)
January 26, 1917.

FORMS OF SCHEDULES.

By
Middleton Smith.

The first sub-heading of the subject "Forms of Schedules" is "Verbiage or wording of questions, month by month."

Let us consider these schedules, month by month, beginning with January. It goes without saying that the verbiage in the box headings should be such as to admit of but one interpretation, and that the answers should be intelligent, so that not much time be consumed in editing preparatory to tabulation. A year ago we added a question to the January Schedule, question number 4 - Milk. Production for year (average per cow) gallons. The Bureau thus far in its tabulation of answers to this question has been able to use only about 60 per cent of the replies. About 40 per cent of the answers read 1, or $1\frac{1}{2}$ gallons per day. To edit such answers the tabulator would have to know the average number of days the cows for which the report was made gave milk. Not knowing this, the tabulator was instructed to blue pencil such answers. The wording of this question seems plain, but nevertheless, a large percentage of the replies is unintelligible, without an explanatory note by the correspondent. Now I will be glad to hear suggestions about the other questions of this schedule, and this one also, if you think the wording could be changed to advantage.

Referring in the March Schedule to question 8 "Land values per acre in county," it was suggested by Dr. Jones, Chief of Division of Crop Reports, that we include in the notes on land values an explanation that the cost of leveling canals and expense for water generally, should be considered as land improvements; in the same sense that in humid sections tiling for drainage, terracing to prevent erosion, etc., are so considered. The Dr. was absent in the field when the March Schedule for this year was submitted for printing and the features he suggested were not added. Instead, the following notes were added, namely, under "with improvements" include farm buildings, etc., and under "without improvements" exclude value of building. Kindly make comment now concerning Dr. Jones' suggestion, about including under land improvements the cost of leveling canals and the expense of water generally, and suggestions concerning the wording of the other questions in the March Schedule.

The only question in the April Schedule of which complaint is made is question 6 "Mortality of lambs from disease and exposure." This question has been asked since the year 1910 and only within the last two years have complaints come in about April first being too early to make reply; one from Coleman County, Texas, which reads: "April first is too early to make report on lambs." This county is about in the central portion of the State. One from Roseau County, Minnesota, which reads "The lamb crop does not come in until about the last of April." This county is in the extreme northwestern section of the State. One from Field Agent, Mr. Marchetti, who writes "The lambing season in southern Oregon, which is the heavy sheep district, is between April 15th and May 15th, and it is difficult to make any estimate by the first of April. Other districts in the State are, of course, earlier." In view of these complaints, the ad-

visability was considered of making the mortality and condition inquiry of live stock May first instead of April first. In certain localities, only a few, however, April first, no doubt, is too early to ascertain the mortality of lambs, but for this reason alone I should not think it advisable to postpone the mortality and condition inquiry concerning the other live stock named in the April Schedule. That would break up the continuity of the statistical record, besides delaying information which for commercial purposes is very important to be issued in April. Last year we had the mortality inquiry of both sheep and lambs in the April and May Schedules. This year it will be omitted in May, and instead a special inquiry concerning mortality of lambs will be made in July.

As already stated, the mortality of sheep and lambs, which is question No. 7 in the May Schedule, will be omitted. Under the heading Hay, question No. 3, the two sub-questions (b) and (c), "Percentage of last year's crop fed to stock and condition of Meadows" will be struck out, and in place thereof the questions in the August Schedule under Hay, question 14, will be asked. These are acreage of tame hay compared with last year and with usual acreage, acreage of wild hay compared with last year, and with usual acreage, and the condition of all hay. It is thought that it is important to publish this information much earlier than we have been, heretofore, doing. It is proposed, however, to ask these questions once more before asking the yield of hay. For the information of Field Agent, Mr. Rickards, I will say that we are carrying out his suggestions in his letter of December 23, 1916, as to the discontinuance of certain crops in the California Schedule.

In the June Schedule we have under consideration the asking of the acreage of alfalfa. We will eliminate questions 12 and 21, Bluegrass for seed and Hemp, respectively, and make inquiry of these crops in certain States only.

In the August Schedules the questions under Hay, question No. 14, may be asked in this schedule. If not, question (c) condition of all hay would be asked.

In the September Schedule it is proposed to ask under question 16, the yield per ton of timothy as well as production. The same under alfalfa, question No. 17.

In 1916, the October Schedule and the tabulating sheet did not justify. We will try to not let this occur again.

We have not as yet considered any change in the November Schedule.

In the December Schedule the notes 1 and 2 will be transferred to the back of the schedule, as the questions to which they refer are on the back. Schedules, with questions only on one side, are printed head to foot on both sides; with questions on both sides they are printed on the face head to foot, and on the back foot to head. This is an advantage to the tabulators of the Bureau, for after tabulating say 10 schedules at a time on the front, the schedules are picked up in bulk, without being

shuffled together and turned upside down ready for the completion of the tabulation, thus obviating the necessity of again arranging the schedules. This method obtains in the Bureau in the tabulation of Township Schedules, and accounts for printing the schedules head to foot and foot to head, as the case requires.

The second sub-heading of the subject is "Elimination of Minor Crops from General Schedule." It would, no doubt, be a good thing to have two classes of schedules, one containing the weighted crops only, and the other the minor or unweighted. It would likewise be a good thing to have five classes of schedules of the minor crops for 5 different groups of States, as we once had. We ought to have a schedule for each State for both the major and minor crops. But the element of expense of printing and of time in handling the schedules must be considered.

SOILS.

By

C. F. Marbut.

There are at least five factors in crop growing:

The Soil,
The Man,
The Climate,
The Plant,
The Topography.

The soil is, therefore, only one of several factors, but a very important one.

There is not a unanimity of opinion on the definition of the soil. One school, represented by the Russian Soil Investigators, would not recognize anything as a soil that has not been profoundly acted upon by weathering agencies, so much so that the original character of the material has been profoundly changed. Another school, represented by geologists, considers any unconsolidated material as soil, regardless of the changes or lack of them. A middle ground is probably better. A soil is an unconsolidated layer of earth material more or less modified by the agencies of weathering since formation. The definition of soil, however, is one that need not worry us here since we know that the layer of earthy material in which plants grow, whatever we may call it, does vary from place to place.

The character of the soil, its productivity, is determined, or at least profoundly influenced, by the climate. The factors of climate of most importance are rainfall and temperature. High rainfall and high temperature age the soil rapidly. Examples:

On the basis of the effect of climate on the soil of the United States, we can divide the eastern part into about three or four east-west belts - an extremely northerly one, a middle one, and a southerly one. Their characteristics and distribution:

After we reach the Mississippi, the climatic belts run north and south and the climate changes from east to west, as well as from north to south. The north-south belts along the east coast are the following:

The Podzols of the far north,
The brown soils of southern New England
and the northern east Central,
The red and yellow soils of the far south.
(The map does not show this broader grouping.)

In the eastern United States, the same belts occur, except the possible failure of the extreme northerly one. They consist mainly of the brown soil in the north with the yellow and red soils in the south.

West of the Mississippi River, and to a slight extent east of it, we get into a different climate and along with it, a different vegetation, which have caused the development of prairies and the black or very dark colored soils. The belts here run east and west like the others, consisting of the prairie soils on the north with their dark color and the timbered soils on the south with their light color.

These zones are further subdivided as follows:

- | | |
|--------------------------|--|
| In the North: | Older and younger - The glacial and the extra
glacial.
The coastal plain and the piedmont.
The valley and the mountains,
The yellow coastal plain, the red, the black,
and the wet. |
| In the Piedmont: | The brown and red. |
| In the Valley: | The red and brown. |
| West of Mountains: | The new in Ohio.
The brown further south in Kentucky and Tennessee.
The yellow and red. |
| In the West: | The prairies come in - prairies due to excess
of moisture, lack of it, lack of seeding,
fires. |
| East of the Mississippi: | Prairies in Central Illinois and Indiana are
due to excess of moisture - very important in
the existence of the Cornbelt. Black or highly
organic soil, abundant moisture, hot summers,
dry enough in hot season to enable corn to grow. |
| West of the Mississippi: | Have dark brown prairie - prairie with clay pan,
or flat prairie, and the very black calcareous
prairie of the Dakotas. |

Corn and Spring Wheat.

West of that the Kastanienfarbige soil - dry forming.

South has red dry soils with hard pans.

RESOLUTIONS.

RESOLVED: That the officials, Field Agents, and members of the Bureau of Crop Estimates of the United States Department of Agriculture, assembled in conference in the City of Washington, do with sincere feeling, express their heartfelt sympathy to Mrs. A. F. Hitt and family, in the death of her husband, the Field Agent for the State of Idaho. This convention also desires to express to Mrs. Hitt and family, appreciation of the valuable services rendered by her husband to the United States Department of Agriculture.

In his death this Bureau has lost the efficient services of a man thoroughly acquainted with the agricultural condition of his State and the Northwest, and whose kindly personality was universally loved by those with whom he came in contact.

Realizing that God will help her in this hour of sadness, we trust that she will be consoled by Him who knows and understands.

Also Resolved: That this be made a part of the record of this conference and that a copy be sent to Mrs. Hitt.

Signed:

Erwin T. Marchetti, Chairman

F. S. Pinney,
Geo. C. Bryant,
Guy Fitzpatrick, Committee.

Adopted by the conference this 26th day of January, 1917.

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RESOLVED: That the officials, Field Agents, and members of the Bureau of Crop Estimates, Department of Agriculture, now in conference assembled in the City of Washington, do hereby extend to Mr. C. J. Blanchard, Statistician of the Reclamation Service, Department of the Interior, their sincere thanks for, and express their high appreciation of, the intensely interesting and very instructive lecture on the work of the Reclamation Service, which he so ably delivered before this convention on the evening of January 25, 1917.

Also Resolved: That this be made a part of the record of this conference, and that copies of this Resolution be delivered to the Secretary of the Interior, the Director of the Reclamation Service, and to Mr. C. J. Blanchard.

Signed:

V. H. Olmsted,
Geo. C. Bryant,
J. L. Cochrun, Committee.

Adopted by the conference this 27th day of January, 1917.

January 27, 1917.

Mr. L. M. Estabrook,
Chief, Bureau of Crop Estimates,
Washington, D.C.

Dear Sir:

By direction and on behalf of the Field Agents of the Bureau of Crop Estimates, in conference assembled at Washington, we the undersigned committee, desire to convey to yourself and the other officers and employees of the Bureau, an expression of our great appreciation of the many courtesies and kindnesses which have been extended to us, not only during our present stay in Washington, but in all of our relations with the Bureau in times past while in our respective States. We are leaving Washington more deeply impressed than ever with the fairness and consideration of those in authority in the Bureau and with a determination to render better service, not only to the Bureau, but to the public generally. We realize to a greater degree than ever before the importance and responsibility of our work and the necessity for careful earnest effort.

Respectfully submitted,

Signed:

V. A. Sanders,
W. F. Callander,
F. G. Kelsey,
(Committee.)



